UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
ENVIRONMENTAL SCIENCE CENTER
701 MAPES ROAD
FORT MEADE, MARYLAND 20755-5350

November 21, 2000

Andrea M. Labik, SC.D.
Director
West Virginia Department of Health and Human Resources
Office of Laboratory Services
Environmental Chemistry Laboratory
Charleston, West Virginia

Re: SDWA Certification Status of the West Virginia Laboratory.

Dear Dr. Labik:

Our records indicate all corrective actions from the last on-site inspection were completed. The last issue was for microbiology SOP updates which were completed back in August 2000. However, to update our certification records please provide your laboratory's Proficiency Testing (PT) sample results on the last study/ies completed since November 1999. Our records indicate a critical need to successfully complete a PT for fluoride and the other anions.

Sincerely,

Joseph Slayton
Technical Director OASQA

cc: David Russell
Robin Costas
Charles Jones, Jr. (3ES10)
Richard Rogers (3WP22)

Certification Update, February 27, 2002

Microbiology

Office of Laboratory Services
Department of Health and Human Resources
Bureau for Public Health
State of West Virginia

by

David E. Russell
Microbiological Assessor

Environmental Protection Agency - Region III
Office of Analytical Services and Quality Assurance
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

A. Summary:

The corrective actions following the Nov. 1999 on-site inspection have been reviewed. All corrective actions are acceptable. The required PT samples were successfully analyzed and recorded in 2000. In accordance with the concluding paragraph in the original on-site report, full certification is recommended for the methods listed below.

Note that according to 40 CFR 141.74, any laboratory certified for total coliform analysis, is also certified for heterotrophic plate count.

B. Certification Status (Recommended by the Certification Officer):

Organisms	Method and Citation[1]	Certification Status
Total Coliforms, Fecal Coliforms (or *E. coli*)	Colilert, SM 9223	Certified
	Multiple-Tube Fermen., SM 9221B,E	Certified
	Membrane Filtration, SM 9222B	Certified
Heterotrophic Bacteria	Heterotrophic Plate Count, SM 9215B	Certified

C. Assessor

David E. Russell, Ph.D.
Biologist

[1] Standard Methods for the Examination of Water and Wastewater, 19th Edition.

Final Microbiology
SDWA Laboratory Evaluation Report
Rev. 2-21-00

Office of Laboratory Services
Department of Health and Human Resources
Bureau for Public Health
State of West Virginia

167 11th Avenue
South Charleston, WV 25303

On-site Evaluation Performed

on

Nov. 29 - Dec. 1, 1999

by

David E. Russell
Microbiological Evaluator

Office of Analytical Services and Quality Assurance
Environmental Science Center
U.S. Environmental Protection Agency, Region III
Ft. Meade, MD 20755-5350

I. Introduction

The microbiology laboratory is currently analyzing drinking and source water for total coliforms using Colilert (MMO-MUG), the Multiple-Tube Fermentation (MTF) technique (100 ml sample volume and bromocresol purple acid indicator), the Membrane Filtration (MF) technique, or Quanti-Tray, each followed by the appropriate procedures for fecal coliforms (or *E. coli*). Heterotrophic Plate Count (HPC) determinations are also performed on lab reagent water using the pour plate method.

Since the last EPA inspection in September of 1996, performance evaluation (PE) samples for total and fecal coliforms (or *E. coli*) have been successfully analyzed using Colilert, MTF, and MF methods in 1997 and 1998. The laboratory analytical staff should be commended for the analytical proficiency demonstrated by this record of PE analyses. PE samples were not analyzed in 1999.

The equipment and procedures employed in the bacteriological analyses of drinking water by this laboratory conform with the provisions of the *Manual for the Certification of Laboratories Analyzing Drinking Water*, 4th Edition (1997, U.S. EPA) , except as described in section III below.

II. Personnel

The following personnel currently analyze drinking and source water for total and fecal coliforms (or *E. coli*) using the Colilert, MTF (100ml volume), MF, or Quanti-Tray methods, and perform HPC analyses on lab reagent water:

Tom Ong
Joyce Vance-Abshire
Mike Flesher
Tracey Bossie
Joe Cochran
Micah Moore

The last three individuals listed have been at the state laboratory less than one year.

The inspector wishes to thank the Microbiology Supervisor, Microbiologists, and Lab Assistants for their cooperation and assistance during the on-site evaluation.

III. Deviations

Deviations from the equipment and analytical procedures in the *Manual for the Certification of Laboratories Analyzing Drinking Water*, 4th Edition (1997, U.S. EPA) are as listed below. Note that all chapter, page, or paragraph numbers and quotes are from the manual.

A. As stated in Chapter III (p.III-4), a laboratory analyzing drinking water should prepare a *written* description of its QA/QC activities (a QA plan), the purpose of which is to "ensure that routinely generated analytical data are scientifically valid and defensible, and are of known and acceptable precision and accuracy." QC procedures are to be specified in SOPs *written* for each method used. Furthermore, it is "the responsibility of the QA manager to keep the QA plan up to date". Although SOPs have been drafted for the Colilert and HPC methods, no SOPs exist for the MTF method (used daily to analyze drinking water) or the occasionally used MF and Quanti-Tray techniques. Nor are there written QA/QC procedures for the use and maintenance of laboratory equipment or general laboratory procedures common to all methods. Therefore, although a few of the elements exist in draft form, there is no complete comprehensive QA plan for drinking water microbiology.

B. Chapter III requires that laboratories, in order to maintain SDWA certification status, analyze PE samples annually. The purpose of this requirement is to confirm that the analytical proficiency of the laboratory is maintained over time despite changes in equipment and personnel that may occur. Although PE samples were successfully analyzed by the Laboratory in 1997 and 1998, none was analyzed in 1999. According to the manual (p. III-7), this omission alone is sufficient basis for downgrading certification status to "provisionally certified".

C. Paragraph 1.2(Chapter V) states that "before analyzing compliance samples, the analyst must demonstrate acceptable results for precision, specificity, and satisfactory analysis on unknown samples." Currently the Laboratory has no record of such a demonstration of analytical proficiency for each new analyst, although other records assessing analyst knowledge are being kept. Note that the above mentioned "unknown samples" could be prepared by the supervisor.

D. The Laboratory should be highly commended for it's practice of rejecting (without analysis) all *drinking water* samples that exceed the 30 hour holding time. *Source water*, however, has a sample holding time of 8 hours (paragraph 6.4 and Surface Water Treatment Rule, 40 CFR 141.74(a)), the purpose of which is to minimize changes in the sample's bacterial assemblage during the period between collection and analysis. Currently this holding time is regularly exceeded because *source water* samples are routinely analyzed the morning after the day they are collected. In addition negative results for the samples that have exceeded the holding time are not flagged as required by paragraph 8.3.5 (as modified in "Errata").

IV. Recommendations

The following remarks are offered as suggestions to help improve the quality and integrity of the data the laboratory generates. Note that all paragraph numbers and quotes are from Chapter V of the *Manual for the Certification of Laboratories Analyzing Drinking Water*, 4th Edition (1997, U.S. EPA).

A. According to paragraph 3.1.5, all pH buffers used "should be dated upon receipt and when opened." Of the three buffer solutions (4.0, 7.0, 10.0) currently in use, two had only the date received marked on them and the third no dates at all. It is recommended as a matter of good laboratory practice that dates received and opened, and the initials of the analyst recording those dates, be marked on all pH buffers in use.

B. According to paragraphs 3.3.2, calibrations of glass and electronic thermometers should be checked annually against an NIST reference thermometer and the results recorded in a log book. Although considerable records of thermometer calibrations were available, they were not organized in such a way as to easily determine the history of calibration of individual thermometers. This problem had been already identified by the Laboratory and a new form or log sheet had been create, but was not yet in use at the time of the on-site visit. One of the new forms will be used for each thermometer; therefore, the record of calibrations for any one thermometer will be readily available. The Laboratory should be commended for this improvement in record keeping.

C. A further improvement in temperature record keeping would be to re-design the temperature recording tables to include the thermometer reading and the corrected temperature for each time the thermometer is read. When only the corrected temperature is recorded, there is no documentation that the analyst actually corrected the thermometer reading with the appropriate correction factor.

D. Regarding records kept for each autoclave, it is recommended that the autoclave for which the records are being kept be clearly indicated on the record form. Although the clip board with the autoclave records hangs next to the relevant autoclave, there is no association recorded on paper between the records and the autoclave.

E. According to paragraph 3.11.5, the "lot number for membrane filters and date received should be recorded." The Laboratory has records of this QC practice up to 1997, but not beyond. The practice should be re-established.

F. Although the Laboratory, pursuant to paragraph 3.14.2, is checking the calibration of each new lot of pre-calibrated test vessels (for Colilert test) and has produced a commendable record documenting this QC practice, it is recommended that the actual volume obtained be

recorded instead of only a check mark. A record of actual volumes would provide raw data that could be assessed independently by other analysts, the microbiology supervisor, or the Laboratory QA officer, and therefore would represent better documentation. Long term trends in test vessel calibration could also be identified.

G. According to paragraph 4.4.3, "each batch of dilution/rinse water should be checked for sterility by adding 50 mL of water to 50 mL of a double strength non-selective broth (e.g., tryptic soy, trypticase soy, or tryptose broth)" and incubated at 35±0.5 °C for 24 hours. If growth occurs entire batch of dilution water should be discarded. At the time of the on-site visit, the Laboratory was not performing this QC sterility check. It is strongly recommended that this QC procedure be performed on all batches of dilution or rinse water, and the results recorded with the other media and dilution water preparation records. Note that if the 50 mL of non-selective broth is sterilized in a typical dilution bottle, the sterility check of the dilution or rinse water can be performed by pouring (with sterile technique) 50 mL of the water into the bottle containing the broth and incubating.

H. It is further recommended that, as matter of good laboratory practice, whenever the pH of a batch of media falls outside the acceptable range, the action taken (e.g., "batch discarded") and analyst's initials be recorded in the media prep log book.

I. Currently when performing the Colilert analysis, the 100 mL±2.5 mL sample test volume is obtained by carefully decanting 100 mL of the sample directly into the sterile IDEXX test vessel and subsequently comparing the volume in the test vessel against a second vessel clearly marked with the acceptable volume range (97.5-102.5 mL). It is recommended that this procedure be improved by doing the comparison at eye-level to make the best evaluation possible. Both bottles should be placed side by side on a platform fixed at eye-level. This recommendation follows what is generally accepted as good laboratory practice when reading any graduated measuring device, such as graduated cylinders or pipettes, i.e., they should always be read at eye-level.

J. Although the laboratory keeps detailed records of all analytical work, including the time an analysis begins, the time any subsequent analyses begins is not recorded. Paragraph 8.4.2 is understood to apply to any subsequent or additional analysis begun after the initial analysis. For example, if a positive MTF test is transferred to BGBB for confirmation, the time of the transfer should be recorded because the BGBB confirmatory test is a new analysis. Likewise if a positive MTF test is also transferred to EC medium for fecal coliforms, the time of transfer should be recorded because it marks the beginning of a new analysis. In other words, it is recommended that for the purpose of quality control, there should be documentation that all tests--presumptive, confirmatory, initial, subsequent, or otherwise--were incubated for the appropriate periods. Documentation on a batch by batch basis would be sufficient.

K. Similarly, it is recommended that for the Colilert analysis the time when the Colilert tests are

read be recorded. This practice would be most important in those cases where a test, following the normal 24 hour incubation, is incubated for an additional 4 hours. The manufacturer cautions that a positive result (yellow color) after incubation for more than 28 hours is not a valid positive. Care should be taken not to incubate samples in excess of 28 hours. (See paragraph 5.6.5.)

L. At the present time, in order to neutralize residual chlorine in a sample, sample bottles are loaded with the appropriate amount of sodium thiosulfate prior to sterilization of the bottle. In addition, when performing the Colilert test, sample is poured into a sterile test vessel that also contains sodium thiosulfate in powdered form. Consequently, residual chlorine is probably being effectively neutralized in all samples analyzed with Colilert. However, with regard to the MTF method, it is possible that in some cases, excessive chlorination is not completely neutralized by the sodium thiosulfate in the sample bottle. It is recommended that a portion of these samples each month (e.g., 10%) be tested with a drop of iodine solution for excess sodium thiosulfate which will be present if all residual chlorine was neutralized. The iodine drop test could be easily performed (by a second analyst) on the sample water remaining in the collection bottle once the 100 mL test volume was removed. The sodium thiosulfate reacts with the iodine to produce sodium tetrathionate and sodium iodide both of which are colorless; consequently the amber color produce by the drop of iodine quickly disappears. If sodium thiosulfate is not present the amber color remains. A similar recommendation was made in 1996.

M. Currently water samples are collected in unmarked bottles and sent to the laboratory with the collection form wrapped around the bottle. Once the unmarked bottle containing the sample arrives in the laboratory, the identity of the bottle and sample depends entirely on the collection form staying with the sample. Because there is no unique identifier (such as a number) on the bottle, there is always the risk of losing the identity of the sample should the collection form and sample become separated. It is recommended that each sample bottle be marked (using an indelible ink marker) with a unique number that is recorded on the sample collection form by the collector. This procedure would insure that all collection information is clearly associated with a sample whether the collection form is kept with the sample or not.

V. Conclusions

The Laboratory's analysts are to be commended for their knowledge of methods and demonstrated commitment to a high level of quality control. Although the on-site evaluation is overall positive, it is recommended that due to the failure to analyze PE (Performance Evaluation) samples in 1999 (see deviation "B" above and Chapter III, p.III-7), the Laboratory's certification status be downgraded to "provisionally certified". Successful analysis of PE samples annually is an essential requirement (as is a favorable on-site evaluation) for maintaining full certification. If EPA receives confirmation that PE samples have been successfully analyzed for total coliform and fecal coliform (or *E. coli*) bacteria, and satisfactory corrective actions are

developed for the other deviations, the Laboratory will be recommended for full certification under the Safe Drinking Water Act.

David E. Russell 2/22/00

David E. Russell Date
Microbiological Evaluator

Final SDWA Lab Certification Program: On-Site Review

Rev. 2-21-00

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services
Environmental Chemistry Laboratory Section
167 11th Avenue
South Charleston, WV 25303

December 1-2, 1999

Joseph Slayton
Associate Director Science

U.S.E.PA. - Region III
Office of Analytical Services and Quality Assurance
701 Mapes Road
Ft. Meade, Maryland 20755-5350

Introduction:

On December 1-2, 1999 an on-site review of West Virginia's SDWA Laboratory Certification Program was conducted of the West Virginia Department of Health and Human Resources, Bureau of Public Health, Office of Laboratory Services. Laboratory SDWA certifications for inorganic and organic chemistry are conducted by Dr. Wayne Morganroth, Laboratory Supervisor, with the assistance of Mr. Larry Duffield, Chemist II and Mr. Greg Young, Chemist I. Laboratory SDWA certifications for microbiology are conducted by Mr. Thomas Ong, Microbiologist Supervisor, and Ms. Joyce Vance-Abshire, Microbiologist III.

This review was conducted through interviews, records/file review and Standard Operating Procedures (SOP) review. A joint inspection with the WV Laboratory Certification Program was planned for a local commercial laboratory but was not performed (See Section #3, in this report).

This review was conducted by Joseph Slayton, Associated Director of Science, USEPA, Region III, Office of Analytical Services and Quality Assurance, 701 Mapes Road, Ft. Meade, Maryland 20755-5350.

Personnel/Training/Vacancies:

Since the last oversight review performed by EPA in 1996, the Bureau for Public Health Laboratory has lost the capability to perform the analysis of organic contaminants for the SDWA. The inspection program lost the Certification Officer (CO), Ms. Brenda Barnett, who had hands-on experience with the SDWA organic protocols. Since the last inspection Dr. Wayne Morganroth, a SDWA CO for inorganic chemistry, has successfully completed the requirement as a Certification Officer for Organic Chemistry (Letter dated July 8, 1999 from Dr. M. Kate Smith, Ecological Exposure Research Division, National Exposure Research Laboratory, Cincinnati, Ohio). Similarly, the Microbiology section lost a CO in 1999, but Ms. Joyce Vance-Abshire has successfully completed the Certification Officer requirements for Microbiology (letter dated July 19, 1999 from Dr. M.K. Smith). Charlotte Billingsley, Associate Director, Division of Environmental & Newborn Laboratory Services, and the Director of the Office of Laboratory Services, Dr. Frank Lambert, both retired within the last few months. The Associated Director had the responsibility to oversee WV's SDWA laboratory certification program. Dr. Andrea Labik, was appointed as Director in October, but the Associate Director position has not yet been filled.

Overview:

The WV Laboratory Certification Program is based upon the Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance, EPA 815-B-97-001, March 1997 and upon the 40 CFR Part 141-143 SDWA requirements, as well as, the analytical methods referenced in these documents. This includes the requirement that laboratories successfully analyze at least one proficiency testing sample per analyte (recently changed in the CFR to "per method") per year and have procedures and documentation, which

are found satisfactory by an on-site inspection by State COs at least once every three years. All of the SDWA Certification Officers are trained professionals with years of laboratory experience. In the case of chemistry, those inspectors not yet "certified" as COs by the EPA are accompanied by Dr. Morganroth who has the responsibility for review and sign-off on the recommendations from Mr. Larry Duffield and Mr. Greg Young. It is planned that Mr. Duffield attend the EPA CO's training course in 2000 and Mr. Young is to attend in 2001.

Certification Program Documentation:

The SOP/ QA Manual for WV's Microbiology Section includes a number of items relevant to the documentation of the Microbiology Certification Program. The topics in the SOP/QA Manual (Rev. 11/29/99) include: Mission Statement; Organizational Chart (Chain-of-Command); Position Requirements for Environmental Microbiology; Position Responsibilities; Personnel Performance (on-the-job-training; testing; performance evaluations); Technical Performance (demonstrated performance by labs to be certified); Laboratory Safety; Chart for Determining Certification Status; Laboratory Certification Officers (qualifications); Performance Evaluation form (used for the evaluation of analysts). The QA Manual for WV's Environmental Chemistry includes few topics relevant to the Chemistry Certification Program. The chemistry laboratory QA manual includes: instructions for sample submission to the laboratory (containers, preservations, sample handling procedures); instrument calibration; analytical procedures; data reduction; data validation and data reporting; data storage; preventive maintenance; internal QC checks and frequency; corrective action; precision and accuracy samples; and sample rejection policy.

In Addition, the WV laboratory certification program has developed an SOP/QA manual entitled: "Drinking Water Certification Program-Microbiology". This document included the following topics: Introduction (cites various supporting federal regulations and the use of the EPA Lab Certification Manual as the focus for the WV Microbiological program); Laboratory Certification Officer (qualifications); Certification Parameters; Certification Renewal (table listing forms, mailing label files, etc.); On-site Evaluations (checklists, procedures, reports, follow-up, etc.); Adding a Certified Laboratory (In-State); Adding a Certified Laboratory (Out-of-State); Performance Evaluation Samples (indicated as "UNDERGOING MAJOR REVISION"); Records Retention and Storage; Drinking Water Laboratory Certification Renewal (form); Laboratory Information Form: Drinking Water Laboratory Certification Renewal*FINAL NOTICE* (form); Drinking Water Certificate; Water Survey Schedule (template to track projected on-site inspections); Presurvey Package (cover letter and pre-survey form); On-site Inspection Report (template); On-site Evaluation Checklist; Follow-up Letter (reminder notice template for response to the on-site inspection); Follow-up Letter (2) (template for responses that were not acceptable); tracking chart for on-site evaluations (tracking corrective actions and correspondence associated with on-site inspections); Application for Laboratory Certification (form); Letter in Response to Out-of-State applications (Note: includes WV's approach to "Reciprocity"); Letter Noting Receipt of Application (form letter); Key to List of Approved Tests (the WV Laboratory CertificationProgram groups analytes for certification); Listing of Labs Certified in WV (listed by analyte groups for both Microbiology and Chemistry).

Observations & Suggestions:

1. Proficiency Testing (PT) Samples: The WV Laboratory Certification Program (WVLCP) has not decided on the details of operating the new PT program (the EPA no longer provides PE/PT samples). The WVLCP should establish a schedule for laboratories to participate in Water Supply studies. Since these samples are now available from commercial vendors, which provide them on a rapid schedule (some as frequently as every month), laboratories will have a great deal of flexibility in scheduling and securing these materials. In addition, the laboratories within the state would benefit from a letter/E-Mail explaining the details of WV's approach to the PT program. In addition, the WVLCP should include the specific plans for the PT program in a written SOP that includes: the scheduling; tracking; follow up and documentation trail and filing system for the PT program. The usefulness/efficiency of an electronic data base for storage of this information should be explored. In addition, since the State has the option under the new PT system to select a PT provider, probably the WV CLP could have the provider directly "populate" WV's PT data base with the individual laboratories results (disk and/or on-line).

2. On-site Laboratory Inspections: The WVLCP should maintain a record which lists the dates of inspections, analytes/analyte groups reviewed, certification status and the target/projected/estimated date (at least quarter) for the next on-site. Currently such information is maintained in an on-going table for Microbiology but a similar tabulation should be considered for Chemistry.

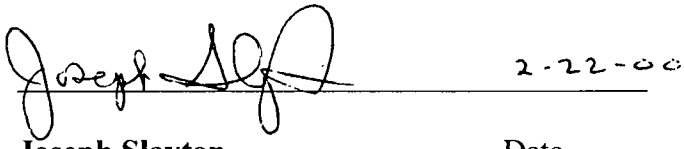
Ten laboratories will require on-site inspections for chemistry during 2000. Two of these laboratories are significantly beyond the required three year period. After the next round of chemistry inspections is completed, the WVLCP should consider working out a schedule of on-site inspections so that they do not all occur in the same year. Microbiology already has a staggered schedule.

3. Internet: The WVLCP has not had routine access to the Internet. It is growing ever more critical that the COs have access to the Internet. The EPA's web page is a vital source of information, e.g., current and projected SDWA regulations. Much information/communications within Region III are via E-Mail and such contacts are considered critically important to the Region III States' Drinking Water Programs. The Internet would be an efficient and effective way to stay in communication with and distribute information to the drinking water laboratories in WV. The laboratories should be encouraged to have access to the Internet- most will have some mode of access.

This review included a scheduled inspection of a laboratory, Bio-Chem Testing Inc., Putnam Village, Unit 23, Treys, WV 25569. Upon arrival at the laboratory, it was found that the laboratory infrequently performed SDWA analyses (only one set in over a year) and that the laboratory was unaware of new methods required by SDWA. The laboratory elected to postpone the inspection until they had come up to speed on the new methodologies; and therefore the

items listed in the NELAC standards should further help assure a quality laboratory inspection program for West Virginia.

Inspector:



2-22-00

Joseph Slayton Date

review of the WV Lab Certification-Chemistry did not include observation of an actual inspection. The WVLCP needs to assure that the laboratories in the program are informed of the current SDWA requirements. An internet/electronic mode of correspondence should be considered.

4. Documentation: The documentation for the Microbiology Certification Program was complete and well organized. The Chemistry Certification Program lacked written procedures for Lab Certification (as detailed above for Microbiology). It is suggested that an SOP/QA Manual for the drinking water laboratory certification chemistry program be prepared.

Given the reality that the current COs lack first hand experience with SDWA organic analyses, it is suggested that efforts to develop method specific checklists should be continued. These should be standardized and made available to all the COs involved (electronic format for ease of distribution and updating). Such checklists are also available from the USEPA and from other Region III State COs.

5. Personnel: Given that Dr. Morganroth alone can certify laboratories to perform organic analyses in West Virginia, it is critically important to the WV Laboratory Certification Program to assure that Mr. Larry Duffield and Mr. Greg Young are approved as Certification Officers for organic chemistry, as well as inorganic chemistry as soon as possible. In addition, since the Associated Director position serves as the central focal point for the WV Lab Certification Program, it is important that this vacancy be filled as soon as possible. The WV Laboratory Certification Program may benefit from the selection of an Associated Division Director with experience in SDWA related chemistry (especially organic chemistry).

The WVLCP should consider the benefits of providing administrative/clerical support to the chemistry and microbiology laboratory certification efforts, since the chemists and microbiologists are spending considerable time tracking and filing information. A part-time aide/clerk may benefit the program.

6. NELAC: As described previously, the WV's Laboratory Certification Program for Chemistry should be reflected in a detailed QA Manual as currently available for the Microbiology Certification Program. Also, for this update it is recommended that the laboratory consider the sections required by the National Environmental Laboratory Accreditation Conference/Program (NELAC) for a Quality Manual. The WVLCP certification manual for micriobiology already is pattern after NELAC. NELAC is an established program with consensus agreement of over 40 states and NELAC standards are consistent with international requirements for certifications of environmental laboratories, e.g., ISO 25. Information necessary for the WVLCP to apply to have its SDWA laboratory certification program approved by NELAC is available in Chapter 6, Accreditation Authorities, of the NELAC standard and the details are available on the NELAC web site at www.epa.gov\ttn\nelac. Whether WV decides to actually become an Accreditation Authority and offer Lab NELAC Accreditation or not, the

Final On-Site Laboratory Evaluation Report (SDWA)

Inorganic Chemistry

(Rev. 2-22-00)

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services
Environmental Chemistry Laboratory Section
4710 Chimney Drive, Suite G
Charleston, WV 25302

November 30- December 1, 1999

Surveyed by:

Joseph Slayton
Robin Costas

U.S.E.P.A. - Region III
Office of Analytical Services and Quality Assurance
701 Mapes Road
Ft. Meade, Maryland 20755-5350

A. Introduction:

On November 30, 1999 an on-site inspection of inorganic chemistry was conducted of the West Virginia Department of Health and Human Resources, Bureau for Public Health, Office of Laboratory Services. The analyses of drinking water samples is conducted at a separate location, Environmental Chemistry Laboratory Section, 4710 Chimney Drive, Suite G, Charleston, WV 25302. The purpose of this inspection was to determine the capability of the laboratory to perform its mission as it relates to the Safe Drinking Water Act (SDWA). The laboratory was represented by Dr. Andrea Labik, Sc.D, Office of Laboratory Services Director, Dr. Wayne Morganroth, Laboratory Supervisor, Mr. Larry Duffield, Chemist II (analysis of metals), and Mr. Greg Young, Chemist I (analysis of inorganic, non-metal analytes).

This inspection was conducted by: Robin Costas, Chemist (evaluation of metals) and Joseph Slayton, Associate Director of Science (evaluation of inorganic, non-metals); USEPA, Region III, Office of Analytical Services and Quality Assurance, 701 Mapes Road, Ft. Meade, Maryland 20755-5350. In addition the Office of Municipal Assistance, Water Protection Division was represented by Mr. Jason Gambetese of the Philadelphia Regional Office (EPA).

Since the last on-site laboratory inspection performed by EPA in 1996, the Bureau of Public Health Laboratory has lost the capability to perform the analyses of organic contaminants for SDWA. In addition, the listing in Section E of this report, "Contaminant Method Information" is the subset of regulated and "unregulated" parameters for which the laboratory is requesting SDWA certification. As indicated in Section E, this requested list represents an abbreviated subset of the SDWA contaminants. Also, the Director of the Office of Laboratory Services, Dr. Frank Lambert, Jr. and the Associate Director of the Division of Environmental & Newborn Laboratory Services have both retired. The new Director, Dr. Andrea Labik, was appointed in October 1999. The Associate Division Director position has not yet been filled.

Compliance samples for total nitrate are routinely analyzed and reported as a sum for (NO2+NO3)-N. The State uses a concentration of 0.5 mg/L to "trigger" the immediate resampling and reanalysis, i.e., this may indicate an NO2-N concentration of 0.5 mg/L which has a maximum concentration limit of 0.5 mg/L. This approach will be discussed with the Region III Drinking Water Program Office to assure compliance with SDWA regulations.

B. Personnel:

The courtesy and professionalism of the laboratory personnel was greatly appreciated by the inspection team. It was apparent from the excellent record keeping and quality control procedures, that the laboratory personnel are dedicated to achieving analytical excellence.

C. Proficiency Testing (PT) Samples:

The laboratory data for Proficiency Testing samples for the years 1997 thru 1999 were discussed

during the on-site evaluation. The laboratory results were "Acceptable" for all regulated inorganic parameters reported with the exception of the following "Not Acceptable" results: September 1997-sulfate; March 1998-nitrite, -O-PO4, -sulfate; September 1998- O-PO4 (nitrate and sulfate - acceptable); 1999- fluoride (O-PO4 not analyzed).

The laboratory indicated problems with the equipment used for fluoride (electrode) and imprecision in using the turbidimetric technique for sulfate. The laboratory has stopped using these techniques and is requesting certification for EPA Method 300.0, Ion Chromatography (IC). The laboratory does not perform ortho- phosphorus analyses and is not requesting certification for this analyte. The laboratory results in 1999 by IC was acceptable for sulfate but not acceptable for fluoride by IC. The problem with fluoride was associated with an interference at the beginning of the chromatographic run called the "water dip". The laboratory indicated that this problem had been corrected.

D. Analytical Method References:

The list of parameters in Section E were audited during this inspection with the associated methodology cited as follows:

(SM) - Standard Methods for the Examination of Water and Wastewater, 18th edition.
(EPA83) - Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79/83.
(EPA93) - Determination of Inorganic Substances in Environmental Samples, Aug 1993, EPA/600/R-93/100.
(EPA94) - Methods for the Determination of Metals in Environmental Samples, May 1994, EPA/600/R-94/111.
(CLADW) - Manual for the Certification of Laboratories Analyzing Drinking Water, March 1997, EPA 815-B-97-001.

E. Contaminant Method Information:

Primary Contaminants:

Parameter	Method	Instrumentation
Antimony	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Arsenic	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Barium	ICP (EPA94, 200.7)	Varian Liberty 100
Beryllium	GFAAS (SM 3113B)	Varian SpectraAA - 400 Plus
Cadmium	GFAAS (SM 3113B)	Varian SpectraAA - 400 Plus
Chromium	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Copper	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Lead	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Mercury	Cold Vapor AA (EPA94, 245.1)	PE-50B W/PE CVAAS
Selenium	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Sodium	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Thallium	GFAAS (EPA94, 200.9)	Perkin-Elmer 5100, HGA 600
Fluoride	EPA 300.0	Dionex-120; AS-40 Autosampler

Nitrate	Automated Cadmium (EPA 353.2)	Technicon Auto-Reduction Analyzer II
Nitrite	Automated Cadmium (EPA 353.2)	Technicon Auto-Reduction Analyzer II
Turbidity	Nephelometric (EPA 180.1)	Hach Ratio Turbidimeter Model 2100A
Conductance	Conductance (SM 2510B)	Model 31 Conductivity Bridge

E. Contaminant Method Information (Cont.):

Unregulated Contaminants:

Parameter	Method	Instrumentation
Nickel	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus

***Secondary Contaminants*:**

Aluminum	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Chloride	EPA 300.0	Dionex-120; AS-40 Autosampler
Iron	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Manganese	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Silver	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
TDS	EPA 160.1 Gravimetric	Gelman A/E GF Filters; Blue M Oven; Mettler AG-245
Zinc	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Sulfate	EPA 300.0	Dionex-120; AS-40 Autosampler

F. Calibration & Detection Information:

Maximum Contaminant Level (MCL), Method Detection Limit (MDL), Reporting Limit (RL as defined by the WV Laboratory, See Section I, Metals)

Primary Contaminants; Lead and Copper Rule; Sodium and Turbidity:

Contaminant	***Calibration Standards* (mg/L)**	**MCL(mg/L)**	**MDL(ug/L)**	**RL(ug/L)**
Antimony	BLK; 0.003; 0.006; 0.012	0.006	0.46	3
Arsenic	BLK; 0.002; 0.005; 0.010; 0.020	0.050	0.81	2
Barium	BLK; 0.50; 5.00; 10.0	2.00	0.000135	5
Beryllium	BLK; 0.0002; 0.0005; 0.001; 0.002	0.004	0.04	0.2
Cadmium	BLK; 0.001; 0.002; 0.004	0.005	0.07	1

Primary Contaminants; Lead and Copper Rule; Sodium and Turbidity (Cont.):

Contaminant	*Calibration Standards* (mg/L)	MCL(mg/L)	MDL(ug/L)	RL(ug/L)
Chromium	BLK; 0.001; 0.0025; 0.005; 0.010	0.100	0.37	1
Copper	BLK; 0.001; 0.0025; 0.005; 0.010	1.3*	0.16	1
Lead	BLK; 0.001; 0.0025; 0.005; 0.010	0.015*	0.86	1
Mercury	BLK; 0.0002; 0.0005; 0.001; 0.002	0.002	0.065	0.2
Selenium	BLK; 0.002; 0.005; 0.010	0.050	0.30	2
Sodium	BLK; 2.0; 5.0;10.0;15.0; 20.0;30.0;50.0;100.0	20.0+	0.07	2000
Thallium	BLK; 0.002; 0.004; 0.008	0.002	0.65	1
Fluoride	BLK; 0.05; 0.1; 0.25; 0.50; 1.00	4.0	TBD	50
Nitrate	BLK; 0.05; 0.10; 0.25; 0.50; 1.00	10.0	9.5	50
Nitrite	Cd Column Check Standard (1.0)	1.0	3.6	50
Turbidity	0.2; 0.4; 0.6; 0.8; 1.0 2; 4; 6; 8; 10 NTU	-	-	0.2NTU
Conductance	0.01N (1413 umhos/cm)	-	-	-
TDS	NIST Traceable Std. Wts.	[500]	-	-
Chloride	BLK; 5; 10; 15; 25; 30	[250]	TBD	500
Sulfate	BLK; 1; 4; 10; 20; 30	[250]	TBD	100

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* "Action Level"
+ "Reportable Level"
"TBD" = To Be Determined

G. Quality Control (QC) Procedures:

The laboratory follows a "Quality Assurance Program Plan for Chemistry Aspects of the West Virginia Bureau for Public Health", (QA Manual, Rev. 1/98). This document includes: instructions for sample submission to the laboratory (containers, preservations, sample handling procedures); instrument calibration; analytical procedures; data reduction; data validation and data reporting; data storage; preventive maintenance; internal QC checks and frequency; corrective action; precision and accuracy samples; and sample rejection policy. A partial list of the QC procedures observed during this inspection included: calibration records for thermometers; on-going temperature records of refrigerators and drying ovens; analysis of an external QC sample with each analytical batch; method detection limit determinations; duplicate analysis (precision measure); spike analysis (accuracy/recovery measure); blank analysis/batch; check standards at 10% frequency (instrument drift measure); instrument "run logs"; cadmium column reduction efficiency measured and recorded; standard weights employed to verify balance performance; detailed/clearly written and quickly retrieved analytical records; and resistance/conductivity of lab pure water recorded each day of use.

H. Analytical Deviations:

Deviations are those laboratory techniques not in compliance with the mandatory requirements of the analytical methods cited above or with the 1997 EPA Manual for the Certification of Laboratories Analyzing Drinking Water, Fourth Edition, EPA/815-B-97-001, (referred to as CLADW). In addition, procedures/techniques, which are considered critical by the inspectors for the production of quality data are cited as "Good Laboratory Practices" (GLP). The following changes are required for the laboratory to maintain in compliance with the SDWA program (40 CFR 142.10):

General:

1. The principle WV state SDWA laboratory must maintain capability and certification for all the contaminants specified in the State Primary Drinking Water Regulations, p. E-1 CLADW, unless the State has been granted wavers for compliance monitoring of these analytes or has contracted with laboratories which are SDWA certified (by EPA or by a state other than WV) for these analytes. A listing of commercial laboratories employed by the State for SDWA compliance monitoring for the analytes not measured at the WV Lab and their current SDWA Certification status (State in which they hold certification, method and analytes) is necessary to complete our records.

2. Many of the QC acceptance/action limits for inorganic-non-metals where fixed limits. However, these criteria were not included in corresponding Standard Operating Procedures (SOPs), e.g., correlation coefficient limit of 0.995 for NO3. The QC limits must be included in the SOP. In addition, the corrective actions to be taken when limits are exceeded should be added to the SOP. The QA Plan only lists a general approach, the SOP needs to list specifics, e.g., stop analysis, take corrective action to correct problem with new reagents, new calibration standards, new pump tubes, new photo multiplier or colorimeter bulb, etc. Also, the SOP should specify that when QC limits are exceeded that all analysis since the last acceptable QC check are to be repeated.

3. Checks of sample preservations, required by CLADW must be recorded, GLP.

4. The laboratory has a Sample Rejection Policy. The laboratory must reject samples not preserved as per CLADW, e.g., turbidity, or the data must be flagged indicated that required preservation was not employed and/or required technical holding times were not met.

ICP Analyses:

5. All samples prepared for ICP analysis must be digested as according to method, ie. the addition of 2 mL (1+1) nitric acid and 1 mL of (1+1) hydrochloric acid. This would translate into 700 uL of nitric acid and 350 uL of hydrochloric acid per 35 mL of sample. (EPA94, 200.7,

11.2.3)

NO2-N & NO3-N:

6. The SOP must be updated to reflect the current EPA methods manual cited by 40 CFR, which is entitled: Determination of Inorganic Substances in Environmental Samples, Aug 1993, EPA/600/R-93/100.

7. Stock calibration solutions must be labeled with the date of preparation, analyst and expiration date. Stock solutions should not be retained more then a month (4C) unless verified to be accurate versus a newly prepared QC sample/ampule, GLP. Similarly, calibration standards are to be prepared fresh with each analytical batch of samples or the accuracy of the standards verified accurate versus a newly prepared QC sample /ampule, GLP.

8. The samples for nitrite-nitrate must be checked and verified free of chlorine or dechlorinating reagent must be added, EPA 353.2, EPA-600/R-93-100, August 1993.

Ion Chromatography (fluoride, chloride, sulfate):

9. Since the last Proficiency Testing sample for fluoride was "Not Acceptable" it is critically important that the laboratory purchase, analyze and forward PT results to EPA which demonstrate "Acceptable" performance, prior to the analysis of additional compliance samples.

10. MDLs have not been determined for the Ion Chromatography (IC) analytes. MDLs are required under SDWA regulations CLADW and EPA Method 300.0

11. An SOP must be prepared for IC analyses, GLP. This can be very brief, with sections referencing EPA Method 300.0 and listing any procedures differing from the referenced method. Where options are listed in the reference method, the SOP must indicate which option/s are actually employed by the laboratory.

12. Samples for sulfate are not refrigerated. Compliance samples are to be transported on ice as per CLADW.

13. An initial demonstration of capability is required for each analyte as per Section 7.2.7 CLADW and as detailed in 300.0.

14. The laboratory has purchased an IC (the first for the lab), but the analyst has not had previous experience with this technology. It is very important that the analyst have formal training available from the instrument manufacturer. It may prove cost effective to host a training course at the WV laboratory (Chimney Drive).

Turbidity:

15. Samples arrive without refrigeration and are held longer then 48 hours. Compliance samples must be maintained at 4C from the time of sampling and analyzed within 48 hour, CLADW.

16. The SOP is dated and does not reference the current required method. The SOP must be updated to reference EPA-600/R-93-100, August 1993.

17. A reagent blank is not analyzed. A blank must be analyzed as per CLADW, however, values below the lowest calibration standard are to be reported as per the current practice (< lowest calibration standard).

Total Dissolved Solids (TDS):

18. Samples are received without refrigeration. Compliance samples for TDS analyses must be maintained at 4C from the time of sampling, CLADW.

Conductance:

19. Samples for conductance are received without refrigeration. Compliance samples for Conductance must be maintained at 4C from the time of sampling, CLADW.

I. Recommendations:

These items are offered as suggestions (not required):

General:

a. It is growing ever more critical that the laboratory managers and staff have access to the Internet. The EPA's web page is a vital source of information, e.g., current and projected SDWA regulations. Much information/communications within Region III are via E-Mail and such contacts are considered critically important to the State's Drinking Water Programs. In addition, since the analysts also serve as SDWA Lab Certification officers, the Internet would be an efficient and effective way to stay in communication with and distribute information to the drinking water laboratories in WV.

b. The QA Manual should be updated to reflect the current analytical procedures. Also, for this update it is recommended that the laboratory consider the sections required by the National Environmental Laboratory Accreditation Conference/Program (NELAC) for a Quality Manual. NELAC is an established program with consensus agreement of over 40 states and is consistent

with international requirements (ISO025) for certification of environmental laboratories. The information for accreditation of WV's Laboratory under NELAC is available in Chapter 5, Quality Systems, of the NELAC standard and the details are available on the NELAC website at www.epa.gov\ttn\nelac. Other specific suggestions include: indication that records will be maintained for at least 5 years; addition of an additional "path" for the corrective action section for when corrective measures do not succeed (e.g., flagging associated data); eliminate corrective action flow chart for organic analytes and add one for inorganic analytes; addition of an organizational chart; reference/s to job description/s; description of training and training plans; list of SOPs; list of signatories for SOPs; requirements for chain-of-custody; list of references, especially for methods; list of tests for which an Initial Demonstration of Capability had been successfully performed.

c. The SOPs are being updated to reflect changes in referenced methods, e.g., NO2+NO3, and changes in technology/method, e.g., IC. It is suggested that the format of the SOP be expanded to include the topics required for method SOPs in the NELAC standards.

d. The ethyl ether stored in the laboratory freezer should be removed. The material may be explosive due to the spontaneous formation of peroxides.

e. The laboratory management should continue in their efforts to replace the vacant Associate Director position. The position is important to the effective coordination and prioritization of the efforts within the Environmental Chemistry and Microbiology Sections. In addition, this position has served to coordinate and oversee WV's SDWA Laboratory Certification Program.

f. An internal peer review should be performed on the inorganic analytical data and the laboratory should begin routine/systematic review/audits of analytical procedures for compliance with the QA manual and the SDWA regulations.

Metals:

g. No value which falls below the calculated MDL should be used in any quality control calculations, ie. do not use these numbers to calculate the Percent Recovery for the Analytical Spike. The concept is that values below the MDL are considered "non-detectable" and, therefore, are not reliable for quality control purposes.

Although, the data being produced is of excellent quality, the reason this is an issue is because of the low Reporting Levels (RL) the analyst is trying to achieve. Some of the MDL levels are very close to the RL and the concern is that the determined MDLs may be biased high for some contaminants. It is suggested that the MDLs be re-analyzed for those contaminants with high MDL levels and low RLs, such as lead, thallium, antimony, chromium. One alternative is to increase the RL (thallium and barium) and extend the linear range of the calibration curve where the Maximum Contamination Level (MCL) will allow.

The following are some excerpts from some documentation which might help clarify issues about the MDL and RL determinations:

CLADW, 7.2.11: "Laboratories may prefer not to report contaminants at levels less than two to three times their MDL or below the level at which they routinely analyze their lowest standard."

CLADW, H-6, 2.3.3: "Although 40 CFR 136, Appendix B, provides several possible approaches to *selecting an estimated detection limit* (inspector's emphasis) for purposes of designing the MDL study...the most reliable method involves an iterative process of measuring achievability of successively lower concentrations until the actual limit of detection is identified. At a minimum, this approach should be used for purposes of establishing the working MDL when a new method is first used by a laboratory." and "The spike concentration should be determined by the signal to noise ratio for each analyte. The same concentration for all analytes will not produce acceptable results. The extractions/analyses should be performed over a period of at least three days to provide more reasonable MDL."

Guidance for Permit Writer's, Appendix B, 1.1: "The Minimum Level (ML) is a term that originated in the EPA 1600 Series methods, and is defined as the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure..."

Guidance for Permit Writer's, Appendix B, 3.1: "Once the permittee has developed a discharge-specific MDL for each analyte, this MDL is translated into a calculated interim ML by multiplying the discharge-specific MDL by a factor of 3.18. The calculated interim ML is rounded to produce the final interim ML." Although, this definition is from a guidance document for the NPDES program, it does give some explanation on the relationship between the MDL concentrations and what should be an expected quantification level for routine analysis. (National Guidance for the Permitting, Monitoring, and Enforcement of Water Quality-Based Effluent Limitations Set Below Analytical Detection/Quantification Levels, March 22, 1994, EPA Draft document).

h. According to the CLADW (page H-4, section 2.3), the Initial demonstration of Capability (IDC) "consists of demonstrating proficiency in four areas: precision, accuracy (bias), method blank background, and method detection limit." It also suggests that labs "should maintain complete records for the IDC which include the bullet items in the Checklist." The Checklist, found on page H-15, section 2.3, describes an Initial Demonstration of Capability as "a minimum of four replicates of a quality control or reference samples processed through all steps of the analytical procedure."

It is highly recommended that the analyst perform this procedure for each contaminant using a known quality control sample. When four aliquots are digested and analyzed, both precision and accuracy measurements can be determined. All IDC records should be

maintained at the laboratory for future review.

i. The digestion logbook should be self-explanatory and include all relevant information about the particular set of samples and the digestion procedure used. The following are suggested additional column headings which would help clarify the work performed: Digestion Type, Block Temperature, Blanks Digested (y/n), LFB Digested (y/n).

NO2+NO3)-N:

j. The MDL study should be repeated with the spike at or slightly above the concentration of the quantitation range (concentration of the lowest calibration standard). The current MDLs were based on spikes at 0.003 mg/L which were below the lowest calibration standard (0.050 mg/L)

J. Certification Status:

Certified:

Arsenic; Antimony; Barium; Beryllium; Cadmium; Chromium; Copper; Lead; Mercury; Selenium; Sodium; Thallium; Nitrite; Nitrate.

Provisionally Certified:

Fluoride; Turbidity; Conductance.

Secondary Analytes:

Acceptable with Minor Deficiencies (Sulfate; Chloride; TDS).

K. Inspectors:

Joseph Slayton 2-22-00
Joseph Slayton Date

Robin L Costas 2.22.00
Robin Costas Date

Response to an
SDWA Laboratory Evaluation Report
of the
Office of Laboratory Services
Department of Health and Human Resources
Bureau for Public Health
State of West Virginia
167 - 11th Avenue
South Charleston, WV 25303

On-site Evaluation Performed

on

November 29 - December 1, 1999

by

David E. Russell
Microbiological Evaluator

Office of Analytical Services and Quality Assurance
Environmental Science Center
U.S. Environmental Protection Agency, Region III
Ft. Meade, MD 20755-5350

Response by

Thomas L. Ong, Microbiologist Supervisor
Laboratory Certification Officer

Date of Response: March 28, 2000

I. Response to Deviatons

A. As stated in Chapter III (p.III-4), a laboratory analyzing drinking water should prepare a *written* description of its QA/QC activities (a QA plan), the purpose of which is to " ensure that routinely generated analytical data are scientifically valid and defensible, and are of known and acceptable precision and accuracy." QC procedures are to be specified in SOPs *written* for each method used. Furthermore, it is "the responsibility of the QA manager to keep the QA plan up to date". Although SOPs have been drafted for the Colilert and HPC methods, no SOPs exist for the MTF method (used daily to analyze drinking water) or the occasionally used MF and Quanti-Tray techniques. Nor are there written QA/QC procedures for the use and maintenance of laboratory equipment or general laboratory procedures common to all methods. Therefore, although a few of the elements exist in draft form, there is no complete comprehensive QA plan for drinking water microbiology.

Response: *The QA Plan/SOP is a number one priority and different parts are currently in the works. For example, the Quanti Tray procedure is now finalized and the MTF method is in the works along with the "QA Forms" section and a General QA Section on Equipment and Reagents. A recent phone conversation with Joe Slayton indicated that only the Drinking Water Certification Program - Microbiology section of the manual made the return voyage back to Ft. Meade. The missing parts will be copied and sent Fed Ex this week and as other parts are completed they will also be forwarded.*

Ex. 5 - Deliberative

Ex. 5 - Deliberative

B. Chapter III requires that laboratories, in order to maintain SDWA certification status, analyze PE samples annually. The purpose of this requirement is to confirm that the analytical proficiency of the laboratory is maintained over time despite changes in equipment and personnel that may occur. Although PE samples were successfully analyzed by the Laboratory in 1997 and 1998, none was analyzed in 1999. According to the manual (p. III-7), this omission alone is sufficient basis for downgrading certification status to "provisionally certified".

W-214401

Ex. 5 - Deliberative

Response: *Since the on-site evaluation, the laboratory was participated in ERA's WS41, on January 10, 2000 for the MTF (100 mL) procedure; WS42, on January 18, 2000 for the Colilert (100 mL) procedure; and WS43 on February 22, 2000 for the Membrane Filter Procedure. In all studies, ERA is to forward a copy of the report to EPA Region III. Currently, the only results that have been received are for WS41 in which all were acceptable. I have compared our results for WS42 to the results listed on ERA's internet site - they too appear to be all Accetpable, although we are still awaiting the final report.*

If you are not receiving copies of these reports, they may be being sent to Charlie

Ex. 5 - Deliberative

Jones at the Philadelphia office. If you need me to forward these to you, please let me know.

C. Paragraph 1.2(Chapter V) states that "before analyzing compliance samples, the analyst must demonstrate acceptable results for precision, specificity, and satisfactory analysis on unknown samples." Currently the Laboratory has no record of such a demonstration of analytical proficiency for each new analyst, although other records assessing analyst knowledge are being kept. Note that the above mentioned "unknown samples" could be prepared by the supervisor.

Response: *At the time of the on-site evaluation, "new analysts" referred to Joe Cochran, Tracy Bossie and Micah Moore. Since then, Micah Moore has left. Joe and Tracy both have successfully examined 10 unknown samples for both the MTF and Colilert procedures. This practice is now in place for all new analysts that are hired.*

Ex. 5 - Deliberative

D. The Laboratory should be highly commended for it's practice of rejecting (without analysis) all *drinking water* samples that exceed the 30 hour holding time. *Source water*, however, has a sample holding time of 8 hours (paragraph 6.4 and Surface Water Treatment Rule, 40 CFR 141.74(a)), the purpose of which is to minimize changes in the sample's bacterial assemblage during the period between collection and analysis. Currently this holding time is regularly exceeded because *source water* samples are routinely analyzed the morning after the day they are collected. In addition negative results for the samples that have exceeded the holding time are not flagged as required by paragraph 8.3.5 (as modified in "Errata").

Response: *The majority of source water samples are received in the mail so the 8 hours holding time is exceeded. Source waters that are received the day they are collected are analyzed the same day (within 8 hours).*

Ex. 5 - Deliberative

All samples that are received exceeding 8 hours are still analyzed; however, the report forms are now mark as "EXCEEDED 8 HOURS - INVALID" in the "Laboratry Remarks" section.

II. Response to Recommendations

A. According to paragraph 3.1.5, all pH buffers used "should be dated upon receipt and when opened." Of the three buffer solutions (4.0, 7.0, 10.0) currently in use, two had only the date received marked on them and the third no dates at all. It is recommended as a matter of good laboratory practice that dates received and opened, and the initials of the analyst recording those dates, be marked on all pH buffers in use.

Response: *It is laboratory procedure to indicate the date received/opened on the buffers. The laboratory uses about a bottle every two weeks. The unmarked bottle during the on-site was a rare oversight of the analyst. We are going to start the practice of recording the analysts initials along with the dates.*

B. According to paragraphs 3.3.2, calibrations of glass and electronic thermometers should be checked annually against an NIST reference thermometer and the results recorded in a log book. Although considerable records of thermometer calibrations were available, they were not organized in such a way as to easily determine the history of calibration of individual thermometers. This problem had been already identified by the Laboratory and a new form or log sheet had been create, but was not yet in use at the time of the on-site visit. One of the new forms will be used for each thermometer; therefore, the record of calibrations for any one thermometer will be readily available. The Laboratory should be commended for this improvement in record keeping.

Response: *New forms are now in use.*

C. A further improvement in temperature record keeping would be to re-design the temperature recording tables to include the thermometer reading and the corrected temperature for each time the thermometer is read. When only the corrected temperature is recorded, there is no documentation that the analyst actually corrected the thermometer reading with the appropriate correction factor.

Ex. 5 - Deliberative

Response: *Currently, there is not enough room on the form to record the math as the main incubator contains 5 thermometers. All analysts are trained to record the corrected temperature.*

D. Regarding records kept for each autoclave, it is recommended that the autoclave for which the records are being kept be clearly indicated on the record form. Although the clip board with the autoclave records hangs next to the relevant autoclave, there is no association recorded on paper between the records and the autoclave.

Response: *Forms now indicate to which autoclave they belong.*

E. According to paragraph 3.11.5, the "lot number for membrane filters and date received should be recorded." The Laboratory has records of this QC practice up to 1997, but not beyond. The practice should be re-established.

Response: *We have not begun using membrane filter procedure for any samples. However, since we do certify other laboratories for the procedure we are going to maintain*

certification for it by annually analyzing PE samples and quarterly running a few samples and performing duplicate counts so that everyone can keep in practice with it. All appropriate QC forms that accompany the MF procedure will be in order. For the filters, the lot number, date received and date put into service will be recorded on a QC form.

F. Although the Laboratory, pursuant to paragraph 3.14.2, is checking the calibration of each new lot of pre-calibrated test vessels (for Colilert test) and has produced a commendable record documenting this QC practice, it is recommended that the actual volume obtained be recorded instead of only a check mark. A record of actual volumes would provide raw data that could be assessed independently by other analysts, the microbiology supervisor, or the Laboratory QA officer, and therefore would represent better documentation. Long term trends in test vessel calibration could also be identified.

Response: *Actual volumes are now being recorded.*

G. According to paragraph 4.4.3, "each batch of dilution/rinse water should be checked for sterility by adding 50 mL of water to 50 mL of a double strength non-selective broth (e.g., tryptic soy, trypticase soy, or tryptose broth)" and incubated at 35±0.5 °C for 24 hours. If growth occurs entire batch of dilution water should be discarded. At the time of the on-site visit, the Laboratory was not performing this QC sterility check. It is strongly recommended that this QC procedure be performed on all batches of dilution or rinse water, and the results recorded with the other media and dilution water preparation records. Note that if the 50 mL of non-selective broth is sterilized in a typical dilution bottle, the sterility check of the dilution or rinse water can be performed by pouring (with sterile technique) 50 mL of the water into the bottle containing the broth and incubating.

Ex. 5 - Deliberative

Response: *This procedure use to be in place but for some reason, possibly the turn-over in personnel, was forgotten. This procedure is now being put back into place.*

H. It is further recommended that, as matter of good laboratory practice, whenever the pH of a batch of media falls outside the acceptable range, the action taken (e.g., "batch discarded") and analyst's initials be recorded in the media prep log book.

Response: *The laboratory has in the past used "REJECTED" stickers when this happens. However, an example of this could not be found during the on-site, nor could the " REJECTED" stickers be found. I will be making new rejected stickers for this purpose and have the analysts initial and record the action taken.*

I. Currently when performing the Colilert analysis, the 100 mL±2.5 mL sample test volume is obtained by carefully decanting 100 mL of the sample directly into the sterile IDEXX test vessel and subsequently comparing the volume in the test vessel against a second vessel

clearly marked with the acceptable volume range (97.5-102.5 mL). It is recommended that this procedure be improved by doing the comparison at eye-level to make the best evaluation possible. Both bottles should be placed side by side on a platform fixed at eye-level. This recommendation follows what is generally accepted as good laboratory practice when reading any graduated measuring device, such as graduated cylinders or pipettes, i.e., they should always be read at eye-level.

Response: *We are going to contact the maintenance department and see if a shelf can be built over the middle of the table.*

J. Although the laboratory keeps detailed records of all analytical work, including the time an analysis begins, the time any subsequent analyses begins is not recorded. Paragraph 8.4.2 is understood to apply to any subsequent or additional analysis begun after the initial analysis. For example, if a positive MTF test is transferred to BGBB for confirmation, the time of the transfer should be recorded because the BGBB confirmatory test is a new analysis. Likewise if a positive MTF test is also transferred to EC medium for fecal coliforms, the time of transfer should be recorded because it marks the beginning of a new analysis. In other words, it is recommended that for the purpose of quality control, there should be documen-tation that all tests--presumptive, confirmatory, initial, subsequent, or otherwise--were incubated for the appropriate periods. Documentation on a batch by batch basis would be sufficient.

Ex. 5 - Deliberative

Response: *We are now making notes on the bench sheets with the start times of all analysis and when samples are read out.*

K. Similarly, it is recommended that for the Colilert analysis the time when the Colilert tests are read be recorded. This practice would be most important in those cases where a test, following the normal 24 hour incubation, is incubated for an additional 4 hours. The manufacturer cautions that a positive result (yellow color) after incubation for more than 28 hours is not a valid positive. Care should be taken not to incubate samples in excess of 28 hours. (See paragraph 5.6.5.)

Response: *See response to Item "J".*

L. At the present time, in order to neutralize residual chlorine in a sample, sample bottles are loaded with the appropriate amount of sodium thiosulfate prior to sterilization of the bottle. In addition, when performing the Colilert test, sample is poured into a sterile test vessel that also contains sodium thiosulfate in powdered form. Consequently, residual chlorine is probably being effectively neutralized in all samples analyzed with Colilert. However, with regard to the MTF method, it is possible that in some cases, excessive chlorination is not completely neutralized by the sodium thiosulfate in the sample bottle. It is recommended

that a portion of these samples each month (e.g., 10%) be tested with a drop of iodine solution for excess sodium thiosulfate which will be present if all residual chlorine was neutralized. The iodine drop test could be easily performed (by a second analyst) on the sample water remaining in the collection bottle once the 100 mL test volume was removed. The sodium thiosulfate reacts with the iodine to produce sodium tetrathionate and sodium iodide both of which are colorless; consequently the amber color produce by the drop of iodine quickly disappears. If sodium thiosulfate is not present the amber color remains. A similar recommendation was made in 1996.

Response: *We have not yet started this procedure. Is there a written procedure that could be forwarded? And could you provide information as to were to obtain the "Iodine Solution"?*

M. Currently water samples are collected in unmarked bottles and sent to the laboratory with the collection form wrapped around the bottle. Once the unmarked bottle containing the sample arrives in the laboratory, the identity of the bottle and sample depends entirely on the collection form staying with the sample. Because there is no unique identifier (such as a number) on the bottle, there is always the risk of losing the identity of the sample should the collection form and sample become separated. It is recommended that each sample bottle be marked (using an indelible ink marker) with a unique number that is recorded on the sample collection form by the collector. This procedure would insure that all collection information is clearly associated with a sample whether the collection form is kept with the sample or not.

Ex. 5 - Deliberative

Response: *We are in the process of ordering new Water Bacteriological Report Forms. The new forms will have a place to record the sample container number. We will be beginning the process of numbering all of our sample containers.*

Conclusion

The laboratory would like to thank Dr. Russel and the EPA team for all of the information obtained during the on-site. Since this document is being sent electronically, I was unable to include any attachments (completed QC Records). If the QC records are needed as verification to the above responses, please let me know and I will forward them by FedEx.

From: Tom Ong <tomong@wvdhhr.org>
To: R3MD1.R3CRL(RUSSELL-DAVE)
Date: 6/16/00 11:19am
Subject: Re: Drinking Water Certification -Reply

Actually, "Audit Procedures" is a section on Internal audits. It will discuss the "Manual Review", the PE Samples and the annual Internal or Mock on-site evaluations. The attachments will be the EPA and FDA on-site evaluation forms.

This won't be a lenghtly section so I hope to have it e-mailed to you by mid next week.

As for the audits of labs in WV, that should be in the Certification Section that you already have.

I do apologize for the delays.

Tom

>>> DAVE RUSSELL <RUSSELL.DAVE@epamail.epa.gov> 06/16 10:21 AM >>>
Tom,
The "Audit Procedures" SOP only pertains to your external audits of WV labs, correct? I've been waiting for it but just realized that if the above is true, I don't need it. Please confirm and I will proceed to complete the micro review.
Thanks,
Dave

From: Tom Ong <tomong@wvdhhr.org>
To: R3MD1.R3CRL(RUSSELL-DAVE)
Date: 5/22/00 4:29pm
Subject: Drinking Water Certification

First, let me apologize in the delay in sending more parts of the SOP/QA Manual. I have attached the Multi Tube Fermenatation Procedure (the principal method for compliance samples) and Section VI - Equipment and Reagents. I still need to complete and forward the Section entitled "Audit Procedures" (hopefully within the next two weeks).

Secondly, to address the situation with the holding time with source waters, I have discussed the situation with the program folks and later in the week, several people from the program office and I will try to get Rick Rogers on a conference call.

Also, I am not in agreement with the decision to downgrade the microbiology certification status as a result of routinely flagging source waters as exceeding the 8 hour holding time for the following reasons:

1. Joe down graded the certification status of the inorganic analytes that were improperly preserved as a result of conservations with Rick Rogers (WPD). Your response was that "For the same reason, it will be necessary to down grade certification status for microbiology."

Although I don't have all of the data as how the inorganics were improperly preserved, it sounds like the lab was not following proper protocal, or doing it correctly. However, the microbioloby lab on the other hand is following the guidelines as set forth in the Manual for the Certification of Laboratories Drinking Water, 4th Edition, March 1997 and as modified in "Errata". Chapter 5, Section 8.3.5 states "If a sample exceeds 30 hours (8 hours for source water samples) sample must be tagged;" and as modified in Errata, "a negative result must be tagged as an invalid sample." The inclusion of this statement alone allows for a mechanism of sample analysis past the holding time (although the results are meaningless).

2. The decision (to down grade certification) was stated as "we cannot issue SDWA certification if compliance samples must be routinely flagged "invalid" or "not for compliance purposes", because the collectiing office is not properly preserving samples or not shipping them to the lab in time to meet the technical holding time.

The SDWA certification program is (to my understanding) based only on drinking water compliance samples (public waters). If a samples is listed upon receipt as "not for compliance purposes", then it does not fall under the jurisdiction of the SDWA. Henceforth, if a sample result is tagged invalid, then it too cannot count towrds drinking compliance under the SDWA.

3. We were commended in your report for rejecting (without analysis) drinking water samples that exceeded the 30 hours. In my opinion, there is no difference in the end result for an "unsatisfactory sample" (due to exceeded holding time) or an "invalid result" (due to exceeded holding time), neither can count for compliance under the SDWA.

In any case, the laboratory should not be down graded for following the procedures as outlined in the manual.

CC: R3MD1.R3CRL(SLAYTON-JOE)

From: DAVE RUSSELL
To: R3HUB.IN."tomong@wvdhhr.org"
Subject: Methods Reference -Reply

Tom,
I have checked the latest (20th) edition of Std Methods and there is no reference yet to these new methods. The best we have then is the Federal Register reference that approves these methods and provides the manufacturer as a source. See 40 CFR 141.21(f)(3) and footnotes #10 and #11. The manufacturers' "descriptions" (what could be called "technical bulletins" perhaps) noted in the footnotes are the only current references we have.

Regarding an earlier message about checklists for these new methods, no I have not yet done inspections where these methods were in use, and therefore I don't have checklists prepared. I recommend getting the descriptions noted in the footnotes above and some complimentary samples of the tests from the manufacturer. Using those materials, you will be able to develop a checklist. Many of the QC measures will be the same as those for the other tests: media prep/storage, test controls, incubation temp. and length, etc.

CC: HILLIARD-ANNIE

From: Tom Ong <tomong@wvdhhr.org>
To: R3MD1.R3CRL(RUSSELL-DAVE)
Date: 6/2/00 12:58pm
Subject: Methods Reference

Do you know of a Method Code or Method Reference for the the new micro tests - E*Colite and m ColiBlue? I have one lab that is asking. PE providers usually ask for this information as well.

From: Tom Ong <tomong@wvdhhr.org>
To: R3MD1.R3CRL(RUSSELL-DAVE)
Date: 4/14/00 9:14am
Subject: Microbiology Certification

Dave,

I've got 2 questions concerning the microbiology certification program:

1. If you were going to certify a laboratory for one of the newly approved tests (MI Agar, E*Colite or m-ColiBlue24), what would you use as the checklist?

2. Do you have much experience with EC Medium + MUG? I was recently at a laboratory that was using EC Medium + MUG (Difco) and it appeared that the uninoculated media fluoresced as much as the inoculated one. The only difference was that the inoculated one was also showing signs of growth (turbidity) in the tubes. If seen this before with the EC Medium + MUG (Difco) and was wondering what your opinion was.

Ex. 5 - Deliberative

From: DAVE RUSSELL
To: Tom Ong
Subject: SDWA Cert.

Tom,
There will be a more formal response forthcoming, but for now just want you to know that per discussions with Rick Rogers and the Water Protection Division, any samples (compliance or non-compliance) that exceed holding times can be analyzed but the results must be flagged as "NOT VALID FOR SDWA COMPLIANCE REPORTING". Please pass the word to Chemistry and others. Regarding Micro Certification, I have the PT results (everything is acceptable); just waiting for the last section of the QA manual. If that checks out as satisfactory, and if samples are flagged with the language above, full certification for microbiology will be possible. Please send the remaining QA material as soon as you have it completed. Thanks.
--Dave Russell

From: Tom Ong <tomong@wvdhhr.org>
To: Andrea Labik <ms#h#271a@wvdhhr.org>
Date: 5/5/00 3:17pm
Subject: Source Water Holding Times

During the November 30 on-site we were deviated for routinely analyzing source waters that exceed 8 hours (because most are received in the US Mail the day after collection).

To correct this problem, we still analyze the sample but make a notation at the bottom of the report form "Exceeded 8 Hours - Invalid".

Starting this practice has caused great concern among the program folks and I have been receiving quite a lot of phone calls. The program folks are especially concerned with the results of their Ground Water Under the Direct Influence Study (GWUDI) coming back as "Invalid". A lot of the systems are several hours away from the laboratory so the mail, UPS or FedEx is their only option. Now it looks like source waters must also be received at <10°C.

Any words of advice you can offer that I can pass on to the program folks? Would Jason, that was here as a part of the on-site evaluation team, be the person the program folks should contact to address some of these concerns? Do you know how other states are handling this?

Secondly, Item 8.3.5 in the Manual for the Certification of Laboratories Analyzing Drinking Water states: "If sample transit time exceeds 30 hours (8 hours for source water samples), sample must be tagged". This is further modified in "Errata" saying: After parenthesis, change to read "a negative result must be tagged as an invalid sample."

This makes sense for drinking water because drinking water is based on a "Presence/Absence" concept so if a sample was coliform-positive and exceeded the holding time it would matter, however, if it were coliform-negative and exceeded the holding time, the coliform could have "died-off", thus resulting in an invalid sample.

However, source water is based on coliform density (numbers), so if a sample exceeded the holding time and is coliform-positive, should that not be invalid as well, because the numbers can greatly change, especially if the sample was unrefrigerated?

I think that all of this shows there is a definite need for lab folks and program folks to get together at regional meetings.

From: DAVE RUSSELL
To: R3HUB.IN("tomong@wvdhhr.org")
Date: 5/23/00 8:33am
Subject: Drinking Water Certification -Reply

Tom,

Thanks for the additional sections of the QA manual.

You make some good points regarding the sampling issue and the SDWA manual. Just to clarify, I was using the phrase "for the same reason" to refer to the reasoning Joe Slayton had set forth in the message to which I was responding (and I had assumed that it was attached and that you had already seen it). I was specifically referring to the exceedances of the 8 hr. holding time for source waters and NOT to the preservation issue. My apologies for not being clearer.

As you know the issue of ROUTINE flagging of samples exceeding holding time (and the related issue of whether these are compliance samples or not) has been raised by Region III's Water Protection Division. They are the ones who will have to make the decision about what is or is not acceptable. I believe all this will be sorted out with a conference call.

From: Tom Ong <tomong@wvdhhr.org>
To: R3MD1.R3CRL(RUSSELL-DAVE)
Date: 5/22/00 4:29pm
Subject: Drinking Water Certification

First, let me apologize in the delay in sending more parts of the SOP/QA Manual. I have attached the Multi Tube Fermenatation Procedure (the principal method for compliance samples) and Section VI - Equipment and Reagents. I still need to complete and forward the Section entitled "Audit Procedures" (hopefully within the next two weeks).

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Also, I am not in agreement with the decision to downgrade the microbiology certification status as a result of routinely flagging source waters as exceeding the 8 hour holding time for the following reasons:

1. Joe down graded the certification status of the inorganic analytes that were improperly preserved as a result of conservations with Rick Rogers (WPD). Your response was that "For the same reason, it will be necessary to down grade certification status for microbiology."

Although I don't have all of the data as how the inorganics were improperly preserved, it sounds like the lab was not following proper protocal, or doing it correctly. However, the microbioloby lab on the other hand is following the guidelines as set forth in the Manual for the Certification of Laboratories Drinking Water, 4th Edition, March 1997 and as modified in "Errata". Chapter 5, Section 8.3.5 states "If a sample exceeds 30 hours (8 hours for source water samples) sample must be tagged;" and as modified in Errata, "a negative result must be tagged as an invalid sample." The inclusion of this statement alone allows for a mechanism of sample analysis past the holding time (although the results are meaningless).

2. The decision (to down grade certification) was stated as "we cannot issue SDWA certification if compliance samples must be routinely flagged "invalid" or "not for compliance purposes", because the collectiing office is not properly preserving samples or not shipping them to the lab in time to meet the technical holding time.

The SDWA certification program is (to my understanding) based only on drinking water compliance samples (public waters). If a samples is listed upon receipt as "not for compliance purposes", then it does not fall under the jurisdiction of the SDWA. Henceforth, if a sample result is tagged invalid, then it too cannot count towrds drinking compliance under the SDWA.

3. We were commended in your report for rejecting (without analysis) drinking water samples that exceeded the 30 hours. In my opinion, there is no difference in the end result for an "unsatisfactory sample" (due to exceeded holding time) or an "invalid result" (due to exceeded holding time), neither can count for compliance under the SDWA.

In any case, the laboratory should not be down graded for following the procedures as outlined in the manual.

CC: R3MD1.R3CRL(SLAYTON-JOE)

From: <Rogers.Rick@epamail.epa.gov>
To: R3MD1.R3CRL(RUSSELL-DAVE,SLAYTON-JOE)
Date: 5/22/00 7:06am
Subject: Re: Thanks and On-site Evaluation Responses -Reply -Reply

Dave, Joe - Since I was out of the office on Friday, I'm not sure if anything else transpired regarding WVDHHR's lab certification status. One thing I'm not clear on is how far down you are down grading their certification status - to provisional or decertified?

Joe - when we did discussed this issue I thought it was more of a programmatic issue if the state drinking water program actually used the results from the flagged samples for compliance determinations. From what I understand, the state program folks don't use their state laboratory for routine compliance monitoring but use it for purposes of follow up to inspections or for complaint sampling. Did you or Dave see evidence of a lot of samples for many public water systems that would indicate the lab was being used for routine compliance work?

Ex. 5 - Deliberative

We have a two day meeting starting here at noon, so I'll be tied up, from then till Tuesday afternoon. I would like to talk about this some more and include the WV program manager - Jason Gambatese - in on the discussion.

Thanks - Rick Rogers

Ex. 5 - Deliberative

Ex. 5 - Deliberative

|--------+----------------------->
| | Dave Russell@EPA 05/19/2000 08:18 AM |
|--------+----------------------->

>----------

To: ms#h#271a@wvdhhr.org, tomong@wvd
cc: Greg Allen/R3/USEPA/US@EPA, Doro Hedrick@EPA, Charlie Jones/R3/USEPA/US@E Krantz@EPA, Cynthia Metzger@EPA, Rick Rogers/R3/USEPA/US@EPA, Joe Slayton@EPA
bject: Thanks and On-site Evaluation Responses
eply -Reply

Ex. 5 - Deliberative

Tom: For the same reason, it will be necessary to down grade certification status for microbiology. Suggest you follow-up on Joe's recommendation.
--Dave

Date: Thu, 18 May 2000 17:37:06 -0400
From: JOE SLAYTON <SLAYTON.JOE@EPAMAIL.EPA.GOV>
To: ms#h#271a@wvdhhr.org, tomong@wvdhhr.org
Cc: ALLEN.GREG@EPAMAIL.EPA.GOV,HEDRICK.DOROTHEA@EPAMAIL.EPA.GOV, JONES.CHARLIE@EPAMAIL.EPA.GOV, KRANTZ.PATRICIA@EPAMAIL.EPA.GOV, METZGER.CYNTHIA@EPAMAIL.EPA.GOV, ROGERS.RICK@EPAMAIL.EPA.GOV, RUSSELL.DAVE@EPAMAIL.EPA.GOV, SLAYTON.JOE@EPAMAIL.EPA.GOV
Subject: Thanks and On-site Evaluation Responses -Reply
Mime-Version: 1.0
Content-Type: text/plain
Content-Disposition: inline

** High Priority **

Tom: First off the answer to your third question about who to report corrective actions...the COs who conducted the assessment is fine and we will forward to Regional Office.

I have discussed another issue with Dr. Russell and with Rick Rogers of our Water Protection Division- regarding the necessity for routinely flagging compliance data. I have down graded the certification status of the inorganic analytes that were routinely improperly preserved as a result of conversations with Rick Rogers (WPD). The decision is that we cannot issue SDWA certification if compliance samples must be routinely flagging "invalid" or "not for compliance purposes", because the collecting office is not properly preserving samples or not shipping them to the lab in time to meet the technical holding time. I would ask that you have the WV program folks call Rick Rogers on this issue directly, 215-814-5711

>>> Tom Ong <tomong@wvdhhr.org>
04/28/00 01:16pm >>>

Dave,

Thanks for the great information. Joyce Vance-Abshire (my other certification officer) ordered a free copy of the article you mentioned off an internet site. I have also received 2 free samples of E*COLITE from Charm Sciences and will be visiting a lab at the end of May that has requested certification for the m-Coli Blue method.

In regards to your response to our response of the November/December on-site evaluation:

1. Have you had any luck obtaining the results from ERA on our WS Studies? I have now received written confirmation from ERA that we have successfully passed WS41 for Multi Tube Fermentation, WS42 for Colilert and WS43 for Membrane Filter and that Region III has been notified.

2. Did you receive the parts of the QA/SOP Manual that I sent FedEx. Within the next 7-10 days you will also receive the Multi Tube Fermentation Procedure, A QA/QC Section on equipment and Reagents and a QA Audit Protocol.

Will you consider this be sufficient to "Complete the Record"? I will still be continuing to work on the manual because it is, as you can already tell, being written to also include the Milk Program.

3. One last item. Dr. Labik gave me a letter from Stanley L. Lawowski, Director of Environmental Services Division - Water Supply Laboratory Certification Authority. It states that the laboratory should notify his office with its corrective action plan and it implementation schedule within 30 days after receipt of the on-site SDWA reports.

Do I need to respond to his office directly or is a copy of the reponse I

submitted to you being forwarded?

CC: R3MD1.R3CRL(HEDRICK-DOROTHEA),R3PA2.R3WATER(GAMBAT...

March 28, 2000

Joseph Slayton
Associate Director Science
U.S. E. P. A. - Region III
Office of Analytical Services and
Quality Assurance
701 Maple Road
Fort Meade, Maryland 20755-5350

Dear Mr. Slayton:

I would like to thank you and your team for the thorough and professional on-site review of the West Virginia SDWA Laboratory Certification Program and the inspections of the inorganic chemistry and microbiology laboratories. Dr. Morganroth and Mr. Ong have prepared responses to specific items listed in their separate reports, particularly with regard to the proficiency testing, on-site laboratory inspections and documentation. I have addressed the issues of the Internet, personnel and NELAC.

Internet: The WVLCP has not had routine access to the Internet. It is growing ever more critical that the COs have access to the Internet. The EPA's web page is a vital source of information, e.g., current and projected SDWA regulations. Much information/communications within Region III are via E-Mail and such contacts are considered critically important to the Region III States' Drinking Water Programs. The Internet would be an efficient and effective way to stay in communication with and distribute information to the drinking water laboratories in West Virginia. The laboratories should be encouraged to have access to the Internet-most will have some mode of access.

Response: The Bureau for Public Health (BPH) realizes that electronic mail is a key component for coordination and communications and realizes that a significant portion of its employees do not have the ability to disseminate information electronically. The Commissioner's office has prepared a strategic plan to provide the Bureau with a multi-year blueprint for information technology. It is envisioned that during the next twelve months, a Wide Area Network will be implemented which will provide connectivity for the Bureau offices in South Charleston and Big Chimney.

Personnel: Given that Dr. Morganroth alone can certify laboratories to perform organic analyses in West Virginia, it is critically important to the WV Laboratory Certification Program to assure that Mr. Larry Duffield and Mr. Greg Young are approved as Certification Officers for organic chemistry, as well as inorganic chemistry as soon as possible. In addition, since the Associated Director position serves as the central focal point for the WV Lab Certification Program, it is important that this vacancy be filled as soon as possible. The WV Laboratory Certification Program may benefit from the selection of an Associated Division Director with experience in SDWA related chemistry (especially organic chemistry).

The WVLCP should consider the benefits of providing administrative/clerical support to the

chemistry and microbiology laboratory certification efforts, since the chemists and microbiologists are spending considerable time tracking and filing information. A part-time aide/clerk may benefit the program.

Response: It is planned that Mr. Larry Duffield will attend the EPA CO's training course in 2000 and Mr. Greg Young will attend in 2001. I have spoken to Dr. Taylor about filling the Associate Director position with someone who has experience in SDWA related chemistry. He supports this approach, however, the actual posting and filling of the Associate Director position has been put on hold until the details of the FY 2001 budget are known. If we are financially able, we hope to recruit and fill this position by July 1, 2000. While we agree that a part-time aide/clerk would benefit the program, we are unable to fund such a person at this time.

NELAC: As described previously, the WV's Laboratory Certification Program for Chemistry should be reflected in a detailed QA Manual as currently available for the Microbiology Certification Program. Also, for this update it is recommended that the laboratory consider the sections required by the National Environmental Laboratory Accreditation Conference/Program (NELAC) for a Quality Manual. The WVLCP certification manual for microbiology already is patterned after NELAC. NELAC is an established program with consensus agreement of over 40 states and NELAC standards are consistent with international requirements for certifications of environmental laboratories, e.g., ISO 25. Information necessary for the WVLCP to apply to have its SDWA laboratory certification program approved by NELAC is available in Chapter 6, Accreditation Authorities, of the NELAC standard and the details are available on the NELAC web site at www.epa.gov\tnn\nelac. Whether WV decides to actually become an Accreditation Authority and offer Lab NELAC Accreditation or not, the items listed in the NELAC standards should further help assure a quality laboratory inspection program for West Virginia.

Response: Dr. Morganroth is currently updating the QA Manual for the Certification Program for Chemistry and will make an effort to pattern this after NELAC. While there is support in the BPH for the WVLCP to have its SDWA laboratory certification program approved by NELAC, we do not have the finances or the trained personnel to seek such approval at this time.

I hope I have adequately responded to your concerns. If you need further clarification, please feel free to contact me.

Very truly yours,

Andrea M. Labik, Sc.D.
Director

From: JOE SLAYTON
To: in:"tomong@wvdhhr.org"
Date: 3/16/00 6:00pm
Subject: Microbiology Quality Manual

Tom...both DaveR and I have searched and we can not find documents related to WV's Microbiology Quality Manual. You mentioned today on the phone that you have the a number of items complete and several in the works and some in progress in response to the on-site review. Could you send what you have either electronic or FedX/Mail with the understanding that this is where it is at this time and is in progress. We have a collection of the States QM's and we would like to add micro to the draft chem. for WV that WayneM provided.

CC: russell-dave

WATER BACTERIOLOGICAL REPORT

COUNTY OF ORIGIN:

REPORT TO BE CHARGED TO:

NAME:

ADDRESS:

CITY:

NAME OF WATER SUPPLY

P.W.S. I.D. #

CODE

COLLECTOR: **TITLE:** **CERTIFICATION #:**

COLLECTORS ORGANIZATION: **PHONE:**

SAMPLE TYPE

- ❑ COMPLIANCE *(SDWA)*:
  - ❑ CWS ❑ NTNCWS ❑ TNCWS
- ❑ RAW *(DILUTIONS REQUIRED)*
  - ❑ SURFACE ❑ GROUND
- ❑ SPECIAL PURPOSE
- ❑ REPEAT FOR LAB#:_____
- ❑ REPLACEMENT FOR LAB#_____

- ❑ INDIVIDUAL HOUSEHOLD:
  - ❑ WELL ❑ CISTERN
  - ❑ SPRING

IS SUPPLY PROTECTED?
❑ YES ❑ NO

- ❑ POOL
- ❑ BEACH
- ❑ BOTTLED WATER/ICE
- ❑ DAIRY FARM
- ❑ DAIRY PLANT
- ❑ OTHER:_____

REPORT TO BE MAILED TO:

NAME:

ADDRESS:

CITY/STATE/ZIP:

SAMPLE COLLECTION:

DATE: / /

TIME:____:____ ❑ AM ❑ PM

COLLECTOR'S INITIALS:_____

CHLORINATED?
❑ YES ❑ NO RESIDUAL:_____ ❑ TOTAL ❑ FREE

pH

SAMPLING POINT

SAMPLE TRANSPORTATION: ❑ US MAIL ❑ UPS ❑ FEDEX
❑ AIRBORNE ❑ OTHER:_____
❑ HAND DELIVERED: ❑ BY COLLECTOR ❑ OTHER:_____
TRANSPORTATION CONDITION:
❑ PROTECTED FROM SUNLIGHT ❑ REFRIGERATED <10°C (50°F)

LAB NO. DATE REC'D

METHOD OF ANALYSIS:

- ❑ MULTI TUBE FERMENTATION
- ❑ CHROMOGENIC/FLUOROGENIC
- ❑ MEMBRANE FILTRATION
- ❑ HETEROTROPHIC PLATE COUNT

SAMPLE ANALYSIS:

DATE:_____

TIME:_____ ❑ AM ❑ PM

ANALYSTS:_____

TEMP:_____°C

TIME REC'D:_____ ❑ AM ❑ PM

REC'D BY:_____ TEMP_____°C

❑ ***SAMPLES NOT EXAMINED DUE TO:**
❑ EXCEEDED TIME ❑ INSUFF. VOLUME
❑ INSUFF. INFO. ❑ UNAUTH. COLLECTOR
❑ CONTAINED RESIDUAL CHLORINE
❑ INSUFF. AIR SPACE TO FACILITATE MIXING

LABORATORY RESULTS:

TOTAL COLIFORMS:	❑ PRESENT	❑ ABSENT	_____ PER 100 mL
FECAL COLIFORMS:	❑ PRESENT	❑ ABSENT	_____ PER 100 mL
E. COLI:	❑ PRESENT	❑ ABSENT	_____ PER 100 mL
FECAL STREPTOCOCCI:	❑ PRESENT	❑ ABSENT	_____ PER 100 mL

HETEROTROPHIC PLATE COUNT: _____ CFU/mL
FECAL COLIFORM : FECAL STREPTOCOCCI RATIO:_____
❑ *INVALID DUE TO:
❑ TURBID ❑ COLOR INDETERMINATE ❑ TNTC ❑ CONFLUENT GROWTH ❑ PARTICULATE MATTER
❑ *LABORATORY ACCIDENT *SEND REPLACEMENT SAMPLE

REMARKS: ❑ REPORTED/❑FAXED TO:_____

DATE REPORTED:

DIRECTOR:

WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES
BUREAU FOR PUBLIC HEALTH - OFFICE OF LABORATORY SERVICES
SO. CHARLESTON, WV 25303
KEARNEYSVILLE, WV 25430

From: Tom Ong <tomong@wvdhhr.org>
To: R3MD1.R3CRL(RUSSELL-DAVE)
Date: 2/1/00 11:11am
Subject: Personell Change

Dave,

Just wanted to let you know that we have lost an analyst since your visit in November 1999. Micah Moore, a Laboratory Assistant II, quit January 21, 2000. Her last working day was January 14, 2000.

We are now going under a restructuring phase. The Media and Glassware Preparation Section that was under Clinical Microbiology has moved under the jurisdiction of Environmental Microbiology effective February 1, 2000 with myself as the supervisor.

Joe Cochran, a Laboratory Assistant II, has been recommended for a promotion to Microbiologist I.

Mike Flesher, a Microbiologist II, is going to be recommended for a promotion to Microbiologist III and will have the added responsibilities of reviewing day-to-day operations of the Media and Glassware Preparation Section.

We still have a Laboratory Assistant II position vacant and will try to fill this position within the next few months.

One comment about the November on-site, we have analyzed and submitted data to ERA for two sets of PE Studies:

1. WS41 - Multi Tube Fermentation (100 mL)
2. WS42 - Chromogenic/Fluorogenic Substrate Test (Colilert 100 mL)

We are scheduled to receive WS43 in February for Membrane Filter Analysis.

M-I
V. 1/88

WATER BACTERIOLOGICAL REPORT

COUNTY OF ORIGIN: Nov '99

REPORT TO BE CHARGED TO:

NAME:

ADDRESS:

CITY:

NAME OF WATER SUPPLY

P.W.S. I.D. #

CODE:

COLLECTOR: TITLE: CERTIFICATION #:

COLLECTORS ORGANIZATION: PHONE:

SAMPLE TYPE:

- ☐ COMPLIANCE *(SDWA)*:
  - ☐ CWS ☐ NTNCWS ☐ TNCWS
- ☐ RAW *(DILUTIONS REQUIRED)*
  - ☐ SURFACE ☐ GROUND
- ☐ SPECIAL PURPOSE
- ☐ REPEAT FOR LAB#:
- ☐ REPLACEMENT FOR LAB#:

- ☐ INDIVIDUAL HOUSEHOLD:
  - ☐ WELL ☐ CISTERN
  - ☐ SPRING
- IS SUPPLY PROTECTED?
  - ☐ YES ☐ NO

- ☐ POOL
- ☐ BEACH
- ☐ BOTTLED WATER/ICE
- ☐ DAIRY FARM
- ☐ DAIRY PLANT
- ☐ OTHER:

REPORT TO BE MAILED TO:

NAME:

ADDRESS:

CITY/STATE/ZIP

SAMPLE COLLECTION:

DATE: / / TIME: : ☐ AM ☐ PM COLLECTOR'S INITIALS:

CHLORINATED?
☐ YES ☐ NO RESIDUAL: ☐ TOTAL ☐ FREE

pH:

SAMPLING POINT

SAMPLE TRANSPORTATION: ☐ US MAIL ☐ UPS ☐ FEDEX ☐ AIRBORNE ☐ OTHER:
☐ HAND DELIVERED ☐ BY COLLECTOR ☐ OTHER:
TRANSPORTATION CONDITION:
☐ PROTECTED FROM SUNLIGHT ☐ REFRIGERATED <10°C (50°F)

LAB NO. DATE REC'D

METHOD OF ANALYSIS:

- ☐ MULTI TUBE FERMENTATION
- ☐ CHROMOGENIC FLUOROGENIC
- ☐ MEMBRANE FILTRATION
- ☐ HETEROTROPHIC PLATE COUNT

SAMPLE ANALYSIS:

DATE:
TIME: ☐ AM ☐ PM
ANALYSTS:
TEMP: °C

TIME REC'D: ☐ AM ☐ PM
REC'D BY: TEMP °C

☐ *SAMPLES NOT EXAMINED DUE TO:
- ☐ EXCEEDED TIME ☐ INSUFF. VOLUME
- ☐ INSUFF. INFO. ☐ UNAUTH. COLLECTOR
- ☐ CONTAINED RESIDUAL CHLORINE
- ☐ INSUFF. AIR SPACE TO FACILITATE MIXING

LABORATORY RESULTS:

TOTAL COLIFORMS:	☐ PRESENT	☐ ABSENT	PER 100 mL
FECAL COLIFORMS:	☐ PRESENT	☐ ABSENT	PER 100 mL
E. COLI:	☐ PRESENT	☐ ABSENT	PER 100 mL
FECAL STREPTOCOCCI:	☐ PRESENT	☐ ABSENT	PER 100 mL

HETEROTROPHIC PLATE COUNT: CFU/mL
FECAL COLIFORM FECAL STREPTOCOCCI RATIO:
☐ *INVALID DUE TO:
☐ TURBID ☐ COLOR INDETERMINATE ☐ TNTC ☐ CONFLUENT GROWTH ☐ PARTICULATE MATTER
☐ *LABORATORY ACCIDENT *SEND REPLACEMENT SAMPLE

REMARKS: ☐ REPORTED/☐ FAXED TO:

DATE REPORTED

DIRECTOR:

WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES
BUREAU FOR PUBLIC HEALTH - OFFICE OF LABORATORY SERVICES
SO. CHARLESTON, WV 25303
KEARNEYSVILLE, WV 25430

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From: Joe Slayton
To: R3HUB.IN("tomong@wvdhhr.org")
Date: 2/6/00 5:29pm
Subject: Response to draft report (Microbiology) -Reply

Dr. Morganroth and Dr Labik could you please provide your comments to the Draft SDWA on-site inspection reports we have provided for Chemistry. Also we need your comments on the draft report on WV's SDWA Lab Certification program. As you can see from the message from Tom Ong, we have received his comments on microbiology. Thanks. JoeS

>>> Tom Ong <tomong@wvdhhr.org> 02/01/00 10:51am >>>
Joe,

Sorry in the delay in responding to the draft report.

I have reviewed the microbiology portion along with the certification program overview (microbiology portion) and do not have any problems with either of them.

I have informed chemistry that you were wanting a response to the draft by the end of January, but I haven't heard from them.

CC: Rogers-rick, gambetese-jason, jones-charlie, in:"a...

From: DAVE RUSSELL
To: R3HUB.IN("ms#h#271a@wvdhhr.org", "tomong@wvdhhr.or...
Subject: Thanks and On-site Evaluation Responses -Reply -Reply

Tom: For the same reason, it will be necessary to down grade certification status for microbiology. Suggest you follow-up on Joe's recommendation.
--Dave

CC: R3MD1.R3CRL(HEDRICK-DOROTHEA, Slayton-Joe), R3MD1....

From: JOE SLAYTON
To: R3HUB.IN."tomong@wvdhhr.org", R3HUB.IN."ms#h#271a@...
Date: 5/18/00 5:37pm
Subject: Thanks and On-site Evaluation Responses -Reply

Tom: First off the answer to your third question about who to report corrective actions...the COs who conducted the assessment is fine and we will forward to Regional Office.

I have discussed another issue with Dr. Russell and with Rick Rogers of our Water Protection Division- regarding the necessity for routinely flagging compliance data. I have down graded the certification status of the inorganic analytes that were routinely improperly preserved as a result of conversations with Rick Rogers (WPD). The decision is that we cannot issue SDWA certification if compliance samples must be routinely flagging "invalid" or "not for compliance purposes", because the collecting office is not properly preserving samples or not shipping them to the lab in time to meet the technical holding time. I would ask that you have the WV program folks call Rick Rogers on this issue directly, 215-814-5711

>>> Tom Ong <tomong@wvdhhr.org> 04/28/00 01:16pm >>>
Dave,

Thanks for the great information. Joyce Vance-Abshire (my other certification officer) ordered a free copy of the article you mentioned off an internet site. I have also received 2 free samples of E*COLITE from Charm Sciences and will be visiting a lab at the end of May that has requested certification for the m-Coli Blue method.

In regards to your response to our response of the November/December on-site evaluation:

1. Have you had any luck obtaining the results from ERA on our WS Studies? I have now received written confirmation from ERA that we have successfully passed WS41 for Multi Tube Fermentation, WS42 for Colilert and WS43 for Membrane Filter and that Region III has been notified.

2. Did you receive the parts of the QA/SOP Manual that I sent FedEx. Within the next 7-10 days you will also receive the Multi Tube Fermentation Procedure, A QA/QC Section on equipment and Reagents and a QA Audit Protocol.

Will you consider this be sufficient to "Complete the Record"? I will still be continuing to work on the manual because it is, as you can already tell, being written to also include the Milk Program.

3. One last item. Dr. Labik gave me a letter from Stanley L. Lawowski, Director of Environmental Services Division - Water Supply Laboratory Certification Authority. It states that the laboratory should notify his office with its corrective action plan and it implementation schedule within 30 days after receipt of the on-site SDWA reports.

Do I need to respond to his office directly or is a copy of the reponse I submitted to you being forwarded?

From: Tom Ong <tomong@wvdhhr.org>
To: Andrea Labik <ms#h#271a@wvdhhr.org>
Date: 5/5/00 3:17pm
Subject: Source Water Holding Times

During the November 30 on-site we were deviated for routinely analyzing source waters that exceed 8 hours (because most are received in the US Mail the day after collection).

To correct this problem, we still analyze the sample but make a notation at the bottom of the report form "Exceeded 8 Hours - Invalid".

Starting this practice has caused great concern among the program folks and I have been receiving quite a lot of phone calls. The program folks are especially concerned with the results of their Ground Water Under the Direct Influence Study (GWUDI) coming back as "Invalid". A lot of the systems are several hours away from the laboratory so the mail, UPS or FedEx is their only option. Now it looks like source waters must also be received at <10°C.

Any words of advice you can offer that I can pass on to the program folks? Would Jason, that was here as a part of the on-site evaluation team, be the person the program folks should contact to address some of these concerns? Do you know how other states are handling this?

Secondly, Item 8.3.5 in the Manual for the Certification of Laboratories Analyzing Drinking Water states: "If sample transit time exceeds 30 hours (8 hours for source water samples), sample must be tagged". This is further modified in "Errata" saying: After parenthesis, change to read "a negative result must be tagged as an invalid sample."

This makes sense for drinking water because drinking water is based on a "Presence/Absence" concept so if a sample was coliform-positive and exceeded the holding time it would matter, however, if it were coliform-negative and exceeded the holding time, the coliform could have "died-off", thus resulting in an invalid sample.

However, source water is based on coliform density (numbers), so if a sample exceeded the holding time and is coliform-positive, should that not be invalid as well, because the numbers can greatly change, especially if the sample was unrefrigerated?

I think that all of this shows there is a definite need for lab folks and program folks to get together at regional meetings.

Ex. 5 - Deliberative

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Cecil H. Underwood
Governor

ENVIRONMENTAL MICROBIOLOGY

Joan E. Ohl
Secretary

April 17, 2000

To: Joe Slayton, Associate Dir. Of Science
U.S.E.P.A., Region III
Office of Analytical Services and Quality Assurance
Environmental Science Center
701 Mapes Road, 3ES20
Ft. Meade, MD 20755-5350

From: Thomas L. Ong, Microbiologist Supervisor

RE: WV SOP/QA Manual

Please find the enclosed SOP/QA Manual. This is basically what we had copied during the on-site inspection plus the Colilert Quanti Tray Procedure has been added. I didn't include the Certification Section because I think you already have a copy.

I will forward the other sections as they become completed so that you will eventually have a complete manual.

BUREAU FOR PUBLIC HEALTH
Office of Laboratory Services
167 11th Avenue
South Charleston, West Virginia 25303-1137
Telephone: (304) 558-3530 FAX: (304) 558-2006

Nov 29 '99

MICROBIOLOGY LABORATORY ANALYSIS REVIEW CHECKLIST

Office of Laboratory Services, Bureau of Public Health

LABORATORY WV Department of Health and Human Resources

ADDRESS 167 11th Ave
South Charleston, WV 25303

TELEPHONE NUMBER/FAX NUMBER (304) 558-3530 / (304) 558-2006

CONDUCTED BY _____

DATE _____

NAMES/TITLES/RESPONSIBILITIES OF KEY PERSONNEL INTERVIEWED

Element	Yes	No	Comments
1. PERSONNEL			
1.1 Supervisor/Consultant			
Supervisor of analyst has a bachelor's degree in microbiology, biology, or equivalent with at least one college-level laboratory course in environmental microbiology, and has a minimum of two weeks course training or 80 hours of on-the-job training in water microbiology at a certified laboratory, or other training acceptable to the State or EPA	✓		
If supervisor not available, consultant with same training and experience substituted, acceptable to the State, and present on-site frequently enough to satisfactorily perform a supervisor's duties	—	—	N/A
1.2 Analyst (or equivalent job title)			
Analyst has a high school education, 3 months bench experience in microbiology, training in microbiological analysis of drinking water acceptable to the State (or EPA) and a minimum of 30 days on-the-job training under an experienced analyst	✓		
Analyst demonstrated acceptable results for precision, specificity, and satisfactory analysis on unknown samples before analyzing compliance samples	✗ DR	✓	No challenge w/ unknowns ✓?
1.3 Waiver of Academic Training Requirement			
Need for specified academic training waived for highly experienced analysts	—	—	N/A
1.4 Personnel Records			
Personnel records maintained on laboratory analysts include academic background, specialized training courses completed and types of microbiological analyses conducted	✓		
2. LABORATORY FACILITIES			
Laboratory facilities clean, temperature and humidity controlled, with adequate lighting at bench top	✓		
Sufficient space available for processing samples, bench top equipment, storage, cleaning glassware and sterilizing materials	✓		
Provisions made for disposal of microbiological wastes	✓		
3. LABORATORY EQUIPMENT AND SUPPLIES			
3.1 pH meter			
Accuracy and scale graduations within ± 0.1 units	✓		
Buffer aliquot used only once	✓		
Commercial buffer solutions dated upon receipt, and when opened. Buffers discarded upon expiration date.		✓	See notebook

per ERRATA list

Element	Yes	No	Comments
Electrodes maintained according to manufacturer's recommendations			
QC Meter standardized each use period with pH 7.0 and either 4.0 or 10.0 buffers, with date and buffers used recorded in log book	✓		No analytical method
QC Commercial buffer solutions dated when received and opened and discarded before expiration date			See notebook
3.2. Balance (top loader or pan)			
Readability of 0.1 g	✓		
QC Calibrated monthly using ASTM type 1, 2, or 3 weights (minimum 3 traceable weights which bracket laboratory weighing needs)	✓		
QC Non-reference weights calibrated every six months with reference weights			N/A
QC Annual service contract or internal maintenance protocol established, records available of most recent recalibration, and correction values on file and used	✓		
QC Reference weight recertified if damaged or corroded			N/A
3.3 Temperature Monitoring Device			
Temperature monitoring devices graduated in 0.5°C increments (0.2°C increments for tests which are incubated at 44.5°C) or less	✓		
No separation in fluid column of glass thermometer	✓		Correct
No dial thermometers used which cannot be adjusted		✓	
QC Glass and electronic thermometers calibrated annually, dial thermometers quarterly, at the temperature used against reference NIST thermometer or one meeting the requirements of NBS Monograph SP 250-23	✓		
QC Calibration factor marked on thermometer and calibration date and calibration factor recorded in QC record book	✓		
QC Thermometer discarded if off more than 1°C from reference thermometer, reference thermometers recalibrated every 3-5 years	✓		
QC Continuous recording devices used to monitor incubator temperature recalibrated annually as above	✓		
3.4 Incubator Unit			
Incubator units have an internal temperature monitoring device and maintain temperature of 35 ± 0.5°C, and if used, 44.5 ± 0.2°C	✓		

Maintenance conducted annually (minimum)

Element	Yes	No	Comments
Thermometers placed on top and bottom shelves of use area in non-portable incubators, with thermometer bulb immersed in liquid (except for electronic thermometers)	✓		
For aluminum block incubator, culture dishes and tubes fit snugly			N/A
QC Calibration-corrected temperature recorded twice daily for days in use, readings separated by at least four hours	✓		
Water bath equipped with gable cover and pump or paddles used to circulate water (recommended for maintaining 44 ± 0.2°C)	✓		
3.5 Autoclave			
Autoclave has internal heat source, temperature gauge with sensor on exhaust, pressure gauge, and operational safety valve	✓		Most Temps < 121.
Maintains sterilization temperature during cycle and completes entire cycle within 45 minutes when 12-15 minute sterilization period used	✓		See notes!!!
Depressurizes slowly enough to ensure media will not boil over and bubbles will not form in inverted tubes	✓		
Pressure cookers not used	✓		Correct
QC Date, contents, sterilization time, temperature, total cycle time, and analyst's initials recorded for each cycle	✓		
QC Copy of service contract or internal maintenance protocol and maintenance records kept	✓		See notes
QC Maintenance conducted annually at a minimum, with record of most recent service performed available for inspection	✓		See notes
QC Maximum-temperature-registering thermometer or continuous recording device used each autoclave cycle and temperature recorded	✓		
QC Overcrowding avoided	✓		
QC Spore strips or ampules used monthly	✓		
QC Automatic timing mechanism checked quarterly with stopwatch or other accurate timepiece or time signal	✓		
Autoclave door seals clean and free of caramelized media	✓		
Autoclave drain screen cleaned frequently	✓		
3.6 Hot Air Oven			
Maintains stable sterilization temperature of 170-180°C for at least 2 hours	✓		
Only dry items sterilized in hot air oven	✓		

Element	Yes	No	Comments
Overcrowding avoided	✓		
Oven thermometer graduated in 10°C increments or less, with bulb placed in sand during use	✓		
QC Date, contents, sterilization time, temperature, and analyst's initials recorded for each cycle	✓		ONLY 2 mos. missed in three years.
QC Spore strip or ampule used monthly		✓	See notes!
3.7 Colony Counter			
Colony counter, dark field model, used to count Heterotrophic Plate Count colonies	✓		
3.8 Conductivity Meter			
Suitable for checking laboratory reagent-grade water, readable in micromhos/cm or microsiemens/cm with measurement error not exceeding 1% or 1 micromhos/cm, whichever is more lenient	✓		
QC Cell constant determined monthly	✓		[illegible]
In-line unit which cannot be calibrated not used to check reagent-grade water		✓	
3.9 Refrigerator			
Maintains 1-5°C	✓		
Thermometer graduated in 1°C increments or less, with thermometer bulb immersed in liquid	✓		
QC Temperature recorded for days in use at least once per day	✓		
3.10 Inoculating Equipment			
Sterile metal or disposable plastic loops, wood applicator sticks, sterile swabs, or sterile plastic disposable pipet tips used	✓		
Wood applicator sticks sterilized by dry heat	✓		
Metal inoculating loops and needles made of nickel alloy or platinum (nickel alloy loops not used for oxidase test)			N/A
3.11 Membrane Filtration (MF) Equipment			
MF units of stainless steel, glass, or autoclavable plastic, not scratched or corroded and do not leak	✓		
QC Graduations on funnels used to measure sample volume checked for accuracy have tolerance of ≤2.5%, and a record of this calibration check retained	✓		

Ex. 5 - Deliberative

Element	Yes	No	Comments
10x to 15x stereo microscope with fluorescent light source used to count sheen colonies	✓		
Membrane filters approved by manufacturer for use in total coliform analysis of water	✓		
Membrane filters of cellulose ester, white, gridmarked, 47 mm diameter, and 0.45 μm pore size	✓		
Membrane filters and pads purchased presterilized or autoclaved before use	✓		
Lot number and date received recorded for membrane filters		✓	
3.12 Culture Dishes (loose or tight lids)			
Presterilized plastic or sterilizable glass culture dishes used	✓		
Sterility of glass culture dishes maintained by placement in stainless steel or aluminum canisters or wrapped in heavy aluminum foil or char-resistant paper			N/A
Loose-lid dishes incubated in tight-fitting container with moistened paper towel	✓		
Opened packs of disposable culture dishes resealed between use periods	✓		
3.13 Pipets			
Glass pipets sterilized and maintained in stainless steel or aluminum canisters or wrapped individually in char-resistant paper or aluminum foil	✓		
Pipets with legible markings, not chipped or etched	✓		
Opened packs of disposable sterile pipets resealed between use periods	✓		See note
Pipets delivering volumes of 10 mL or less accurate within 2.5% tolerance	✓		
Micropipetters used with sterile tips,calibrated annually, and replaced if tolerance greater than 2.5%	✓		
3.14 Culture Tubes and Closures			
Tubes of borosilicate glass or other corrosion-resistant glass or plastic	✓		
Culture tubes and containers of sufficient size to contain medium plus sample without being more than three quarters full	✓		
Tube closures used of stainless steel, plastic, aluminum, or screw caps with non-toxic liner; cotton plugs not used	✓		

Element	Yes	No	Comments
3.15 Sample Containers			
Wide-mouth plastic or non-corrosive glass bottles, with non-leaking ground glass stoppers or caps with non-toxic liners, or sterile plastic bags containing sodium thiosulfate used	✓		
Sample container capacity at least 120 mL (4 oz)	✓		
Glass stoppers covered with aluminum foil or char-resistant paper for sterilization			p/A
Sample containers sterilized by autoclaving or (for glass bottles) dry heat	✓		
Containers moistened with several drops of water before autoclaving to prevent "air lock" sterilization failure	✓		
Sufficient sodium thiosulfate added to sample containers before sterilization, if laboratory analyzes chlorinated water	✓		Suggest NaThio ✓
3.16 Glassware and Plasticware			
Glassware made of borosilicate glass or other corrosion-resistant glass, free of chips and cracks, with markings legible	✓		
Plastic items clear and non-toxic to microorganisms	✓		
QC Graduated cylinders and pre-calibrated containers used to measure samples volumes accurate with a tolerance of 2.5% or less	✓		See notes
QC New lots of pre-calibrated containers validated to have 2.5% tolerance	✓		See notes Reconsider working w/ actual vol.
3.17 Ultraviolet Lamp (if used)			
Unit cleaned monthly by wiping with soft cloth moistened with ethanol	✓		
★ QC If used for sanitization, tested quarterly with UV light meter or by agar spread plate method (other methods acceptable if data demonstrates they are as effective)		—	N/A Not used. Rely on blanks.
4. GENERAL LABORATORY PRACTICES			
Laboratory facilities clean, temperature and humidity controlled, and adequate lighting	✓		
4.1 Sterilization Procedures			

Element	Yes	No	Comments
Required times for autoclaving material at 121°C (except for membrane filters and pads and carbohydrate-containing media, indicated times represent minimum times, dependent upon volumes, containers, and loads): - membrane filters and pads 10 min - carbohydrate containing media 12-15 min - contaminated test materials 30 min - membrane filter assemblies 15 min - sample collection containers 15 min - individual glassware 15 min - dilution water blank 15 min - rinse water (0.5 - 1 L) 15-30 min* * time depends upon water volume per container and autoclave load	✓		See notes re 12C < 121 30 min.
Autoclaved membrane filters and pads and all media removed immediately after completion of sterilization cycle	✓		
Membrane filter equipment autoclaved before beginning of first filtration series (filtration series ends when 30 minutes or longer elapses after a sample filtered)	✓		
When UV light (254 nm) used to sanitize equipment, all supplies presterilized and QC checks conducted on UV lamp	—		N/A blanks
UV light used to control bacterial carry-over between samples during filtration series (optional)	—		N/A blanks
4.2 Sample Containers			
QC Sterility of each lot of sample containers or bags confirmed by adding 25 mL of a sterile non-selective broth to at least one container, incubating at 35 ± 0.5°C for 24 hours and checking for growth	✓		
4.3 Reagent-Grade Water			
Only satisfactorily tested reagent water from stills or deionization units used to prepare media, reagents and dilution/rinse water	✓		

Element			Yes	No	Comments
QC Quality of reagent water should be tested and meets the following criteria:					
- conductivity	<2 micromhos/cm (microsiemens/cm) at 25°C	monthly	✓		See notes
- Pb, Cd, Cr Cu, Ni, Zn	not greater than 0.05 mg/L per contaminant, and no greater than 0.1 mg/L total	annually	✓		
- total chlorine residual*	<0.1 mg/L	monthly	✓		
- heterotrophic plate count*	<500/mL	monthly	✓		
- bacteriological quality of reagent water*	ratio of growth rate 0.8 to 3.0	annually	✓		
*See section 4.3.2 of this chapter for additional details					
4.4 Dilution/Rinse Water					
Stock buffer solution or peptone water prepared as specified in Standard Methods			✓		
Stock buffers autoclaved or filter-sterilized and containers labeled, dated, and refrigerated					N/A
Stored stock buffer free of turbidity					N/A
QC Each batch of dilution/rinse water checked for sterility by adding 50 mL of water to 50 mL double strength non-selective broth, incubating at 35 ± 0.5°C for 24 hours, and checking for growth				✓	See notes only used on Quanti & MF.
4.5 Glassware Washing					
Distilled or deionized water used for final rinse			✓		
QC Glassware inhibitory residue test performed on initial use of washing compound and whenever different formulation or washing procedure used			✓		
QC Batches of dry glassware spot-checked for pH reaction			✓		
Laboratory glassware washed with detergent designed for laboratory use			✓		
5. ANALYTICAL METHODOLOGY					
5.1 General					

Element	Yes	No	Comments
Only analytical methodology specified in Total Coliform Rule and Surface Water Treatment Rule used for compliance samples	✓		
Laboratory certified for all analytical methods it uses for compliance purposes	✓		
Laboratory certified for at least one total coliform method and one fecal coliform or *E. coli* method	✓		
Laboratory certified for a second total coliform method, if one method cannot be used for some drinking waters	—		N/A
Laboratory that enumerates heterotrophic bacteria (i.e., HPC) for compliance with the Surface Water Treatment Rule certified for the Pour Plate Method			N/A
Absorbent pads, when used, saturated with liquid medium and excess removed	✓		
Water sample shaken vigorously (about 25 times) before analysis	✓		
QC If no total coliform-positive results occur during a quarter, laboratory performs coliform procedure using a known coliform-positive, fecal coliform- and/or *E. coli*-positive control to spike the sample		✓	
Sample volume analyzed for total coliforms in drinking water is 100 ± 2.5 mL	✓		
Media			
Dehydrated or prepared media manufactured commercially used (strongly recommended)	✓		
Dehydrated media stored in cool dry location and caked or discolored dehydrated media discarded	✓		
QC Laboratory media preparation records include: - date of preparation - type of medium - lot number - sterilization time and temperature - final pH - technician's initials	✓		See note re initials
QC For liquid media prepared commercially, the following are recorded: - date received - type of medium - lot number - pH verification			N/A

Element	Yes	No	Comments
QC Liquid media prepared commercially discarded by manufacturer's expiration date			N/A
QC Each new lot of dehydrated and prepared commercial medium checked before use with positive and negative culture controls and results recorded	✓		
QC Each new batch of laboratory-prepared medium checked before use with positive and negative culture controls and results recorded	✓		
Prepared plates refrigerated in sealed plastic bags or containers not longer than two weeks, with bag or container dated with preparation or expiration date			N/A
Loose-cap tubes of broth stored at $<30°C$ no longer than two weeks, tightly capped tubes no longer than 3 months at $<30°C$	✓		
Refrigerated medium incubated at room temperature overnight before use and discarded if growth observed	✓		
QC Parallel testing performed between a newly approved test procedure and another EPA-approved procedure for several months and/or several seasons (recommended)			N/A
5.2 Membrane Filter (MF) Technique (for total coliforms in drinking water)			
Media			
M-Endo broth or agar or LES Endo agar in single step or enrichment technique used			N/A
Ethanol not denatured	✓		
Medium prepared in sterile flask and dissolved using boiling water bath or hot plate with stir bar	✓		
Medium not boiled	✓		
LES Endo agar medium pH 7.2 ± 0.2 M-Endo medium pH 7.2 ± 0.1	✓		
MF broth refrigerated no longer than 96 hours, poured MF agar plates no longer than 2 weeks, ampuled M-Endo broth as per manufacturer's expiration date	✓		
Uninoculated media discarded if growth or surface sheen observed	✓		
QC Sterility check conducted on each funnel in use at beginning and end of each filtration series (filtration series ends when 30 minutes or more elapse between sample filtrations)	✓		

Element	Yes	No	Comments
QC If sterility control indicates contamination, all data rejected and another sample requested	✓		
Funnels rinsed with two or three 20-30 mL portions of sterile rinse water after each sample filtration to prevent carry-over	✓		
Inoculated medium incubated at 35° ± 0.5°C for 22-24 hours	✓		
Samples resulting in confluent or too numerous to count (TNTC) growth invalidated unless total coliforms detected (if laboratory performs verification test before invalidation and test is total coliform-positive, sample is reported as such, but if test is total coliform-negative, sample is invalidated)	✓		
Sample not invalidated if membrane filter contains at least one sheen colony	✓		
All sheen colonies verified (up to a maximum of five) using either single strength (LB) or (LTB) and single strength (BGLBB) or an EPA-approved cytochrome oxidase and beta-galactosidase rapid test procedure	✓		
When picking individual colonies, up to five red questionable sheen colonies and/or red non-sheen colonies verified to include different types or entire MF surface is swabbed	✓		
When EC medium or EC medium + MUG used, colonies transferred by employing one option specified by 141.21 (f)(5)	✓		
Swab used to transfer presumptive total coliform-positive culture can inoculate up to three different media (e.g., EC medium, LTB, and BGLBB in that order)	✓		
5.3 Multiple Tube Fermentation Technique (MTF or MPN) (for total coliforms in drinking water)			
Total sample volume of 100 mL examined by test configuration found in 141.21 (f)(3) or Appendix G	✓		
Media			
LTB used in presumptive test and BGLBB in confirmed test	✓		
LB used if system conducts at least 25 parallel tests between this medium and LTB and demonstrates false-positive rate and false-negative rate for total coliforms of less than 10%, with comparison documented and records retained	✓		N/A
LTB pH 6.8 ± 0.2	✓		
BGLBB pH 7.2 ± 0.2	✓		
Test medium concentration adjusted to compensate for sample volume so resulting medium single strength after sample addition	✓		

yellow = acid

Element	Yes	No	Comments
If single 100 mL sample volume used, inverted vial replaced with acid indicator (= bromocresol purple)	✓		This is what lab does for 100 ml samples.
Medium autoclaved at 121°C for 12-15 minutes	✓		but T°C < 121.
Inverted vials in sterile medium free of bubbles and at least one-half to two-thirds covered after water sample added	✓		
Refrigerated sterile MTF media incubated overnight at room temperature before use, with tubes/bottles showing growth and/or bubbles discarded. Media discarded if evap. exceeds 10% of original volume.			N/A
Prepared broth media stored in dark at <30°C for no longer than 3 months in screw-cap tubes/bottles, two weeks for those with loose-fitting closures	✓		
Media discarded if evaporation exceeds 10% of original volume	✓		
Inoculated medium incubated at 35°C ± 0.5°C for 24 ± 2 hours	✓		
If no gas or acid detected, inoculated medium incubated for another 24 hours	✓		
All samples showing turbid culture (i.e., heavy growth, opaque) in the absence of gas/acid production invalidated and another sample collected from the same location (if laboratory performs confirmed test on turbid culture and confirmed test is total coliform-positive, sample reported as such, but if total coliform-negative, sample is invalidated)	✓		
All 24- and 48-hour gas-positive or acid-positive tubes confirmed using BGLBB	✓		
Completed Test not required			N/A
When MTF test used on water supplies that have a history of confluent growth or TNTC by the MF procedure, all presumptive tubes with heavy growth without gas/acid production submitted to confirmed test and fecal coliform/*E. coli* test to check for coliform suppression	✓		
5.4 Presence-Absence (P-A) Coliform Test (for drinking water)	←		N/A
Medium			
When six-times formulation strength medium used, medium filter-sterilized, not autoclaved			✓
Medium autoclaved for 12 minutes at 121°C with total time in autoclave less than 30 minutes and with space between bottles			✓
Medium pH 6.8 ± 0.2			

ERRATA

-?

Element	Yes	No	Comments
Prepared medium stored in the dark at <30°C for no longer than 3 months			
Stored medium discarded if evaporation exceeds 10% of original volume			
100 mL sample inoculated into P-A culture bottle			
Medium incubated at 35° ± 0.5°C and observed for yellow color (acid) after 24 and 48 hours			
Yellow cultures confirmed in BGLBB and fecal coliform/*E. coli* test conducted			
Non-yellow turbid culture in P-A medium invalidated and another sample obtained from the same location (if confirmed test performed and sample is total coliform-positive, sample is reported as such, but if confirmed test is negative, sample invalidated)			
5.5 Fecal Coliform Test (using EC Medium for fecal coliforms in drinking or source water, or A-1 Medium for fecal coliforms in source water only)			
EC medium used to determine whether total coliform-positive culture taken from distribution system contains fecal coliforms, in accordance with Total Coliform Rule	✓		
EC medium used to enumerate fecal coliforms in source water, in accordance with Surface Water Treatment Rule, using cultures transferred from each total coliform-positive tube		✓	N/A
Three sample volumes (10, 1, and 0.1 mL) and 5 or 10 tubes/sample volume used			
Autoclaved at 121°C for 12-15 minutes	✓		autoclaved at 121°
Medium pH 6.9 ± 0.2	✓		
Inverted vials free of bubbles and at least one-half to two-thirds covered after sample added	✓		
Tubes with loose-fitting closures used within two weeks, tightly closed screw-cap tubes no longer than 3 months when held in the dark at <30°C	✓		
Refrigerated medium incubated at room temperature overnight before use and tubes with growth or bubbles in vials discarded	✓		
Alternatively, A-1 Medium used to enumerate fecal coliforms in source water, in accordance with Surface Water Treatment Rule	—		N/A
A-1 medium not used for drinking water samples	—		N/A

Element	Yes	No	Comments
Three sample volumes of source water (10, 1, and 0.1 mL) and 5 or 10 tubes/sample volume used			
Autoclaved at 121°C for 10 minutes			
Medium pH 6.9 ± 0.1			
Inverted vials free of air bubbles and at least one-half to two-thirds covered after water sample added			
Loose-cap tubes stored in dark at room temperature no longer than 2 weeks, tightly closed screw-cap tubes no longer than 3 months when held in the dark at <30°C			
Water level in water bath above upper level of medium in culture tubes			
EC Medium incubated at 44.5°C ± 0.2°C for 24 ± 2 hours			
A-1 Medium incubated at 35°C ± 0.5°C for 3 hours, then at 44.5°C ± 0.2°C for 21 ± 2 hours			
Any gas detected in inverted vial considered fecal coliform positive			
5.6 Chromogenic/Fluorogenic Substrate Tests (MMO-MUG Test [Colilert] for total coliforms in source water and total coliforms and *E. coli* in drinking water; Colisure Test for total coliforms and *E. coli* in drinking water)			
Media		✓	
Purchased from commercially available source only	✓		
Media protected from light	✓		IMPORTANT!
Colisure medium refrigerated until use, brought to room temperature before adding sample			N/A
Each lot of medium checked for autofluoresence before use with 366-nm ultraviolet light with 6 watt bulb	✓		
Medium which exhibits faint fluorescence discarded and another lot used			
Medium plus sample which exhibits color change before incubation discarded and another batch of medium used	✓		
QC Each lot of medium checked by inoculating sterile water containing the medium with a MUG-positive *E. coli* strain, a MUG-negative coliform, and a non-coliform and analyzing them	✓		Not 1st test batch
If Quanti-Tray or Quanti-Tray 2000 test used with Colilert medium, sealer checked monthly to determine leakage	✓		

Element	Yes	No	Comments
Glass bottles that contain inoculated medium checked with 366-nm ultraviolet light source with 6 watt bulb and discarded if fluorescence observed before incubation			N/A
For enumeration of total coliforms in source water with Colilert Test, 5 or 10 tube MTF, Quanti-Tray, or Quanti-Tray 2000 used for each sample dilution tested	✓		
For chromogenic/fluorogenic substrate test only, sterile dechlorinated tap water, deionized water, or distilled water used as dilution water	✓		See note1 No QC on Sterile H_2O
For determining presence of total coliforms in drinking water by chromogenic/fluorogenic substrate test, 10 tubes each containing 10 mL water sample or single vessel containing 100 mL sample used			N/A
For Colilert Test:			
Sample incubated at 35° ± 0.5° for 24 hours (for Colilert-18 test, sample incubated 18 hours)	✓		
Yellow color in medium equal to or greater than reference comparator indicates total coliform presence	✓		
Medium with yellow color lighter than comparator and incubated for another 4 hours (28 hours total)	✓		
Yellow color in medium lighter than comparator incubated for 28 hours recorded as negative	✓		
For Colisure Test:			N/A
Sample incubated at 35° ± 0.5°C for 28 to 48 hours			↓
Total coliform positive sample indicates color change from yellow to magenta			✓
For *E. coli* determination, UV lamp (366-nm, 6-watt) shone on total coliform-positive bottles/tubes in darkened room with blue fluorescence indicating *E. coli* presence	✓		
QC Air-type incubators tested to determine time necessary for cold 100 mL water sample (or set of 100 mL water samples) to reach incubation temperature of 35°C, ensuring specified incubation time at that temperature is followed	✓		
Colilert/Colisure Test not used to confirm total coliforms on membrane filters	✓		CORRECT
Colilert/Colisure Test not used to confirm total coliforms in MTF or P-A tests	✓		11
5.7 EC Medium + MUG (for *E. coli*)	✓		N/A

Element	Yes	No	Comments
Total coliform-positive culture transferred to EC medium + MUG			N/A
Medium			
MUG added to EC medium before autoclaving or commercially available EC + MUG used			
Final MUG concentration 50 µg/mL			
Medium pH 6.9 ± 0.2			
Inverted vial omitted (optional)			
Test tubes and autoclaved medium checked for autofluorescence before use with 366-nm UV light			
If fluorescence exhibited, non-fluorescing tubes or another lot of medium that does not fluoresce used or MUG-positive (*E. coli*) and a MUG-negative (e.g. uninoculated) control included for each analysis			
Prepared medium in tubes with loose-fitting closures used within two weeks, or three months for tightly closed screw-cap tubes when held in the dark at <30°C			
Uninoculated medium with growth discarded			
QC Each lot of commercially prepared medium and each batch of laboratory-prepared medium checked by inoculating LTB with positive and negative culture controls, incubating at 35°C ± 0.5°C for 24 hours and then transferring to EC Medium + MUG for further incubation at 44.5°C ± 0.2°C for 24 hours, with results read and recorded			
Water level of water bath above upper level of medium			
Incubated at 44.5° ± 0.2°C for 24 ± 2 hours			
Fluorescence checked using UV lamp (366-nm) with 6 watt bulb in a darkened room			✓
5.8 Nutrient Agar + MUG Test (for *E. coli*)			—
Medium			N/A
Medium autoclaved in 100 mL volumes at 121°C for 15 minutes			
MUG added to Nutrient Agar before autoclaving or Nutrient Agar + MUG purchased commercially			✓
Final MUG concentration 100 µg/L			
Medium pH 6.8 ± 0.2			✓

Element	Yes	No	Comments
Medium in petri dishes stored refrigerated in plastic bag or tightly closed container and used within two weeks			
Refrigerated sterilized medium incubated at room temperature overnight and plates with growth discarded			
QC Quality of medium lot/batch evaluated by filtering or spot-inoculating positive and negative control cultures onto membrane filter on M-Endo medium, incubating at 35°C for 24 hours, then transferring filter to NA + MUG and further incubating at 35°C for 4 hours, with results read and recorded			
Filter containing total coliform colony(ies) transferred to surface of Nutrient Agar + MUG medium			
Before incubation, presence of each sheen colony marked on petri dish lid with permanent marker, and lid and base marked to realign lid when removed			
For total coliform verification test, portion of colony transferred with needle before or after NA + MUG incubation			
Alternatively, membrane filter surface swabbed with sterile cotton swab after 4 hour incubation and transferred to total coliform verification test			
Inoculated medium incubated at 35 ± 0.5°C for 4 hours			
Fluorescence checked using UV lamp (366 nm) with 6 watt bulb in a darkened room, with any fluorescence in halo around sheen colony considered positive for *E. coli*			✓
5.9 Heterotrophic Plate Count for enumerating heterotrophs in drinking water			
Pour Plate Method used for enumerating heterotrophic bacteria in drinking water and for testing reagent grade water	✓		ONLY FOR SOURCE WATER & LAB R. H_2O
For systems granted a variance from Total Coliform Rule's maximum contaminant level, any method in Standard Methods used with R2A medium for enumerating heterotrophic bacteria in drinking water			N/A
Media (plate count agar [tryptone glucose extract agar] and R2A agar)			
Plate count agar pH 7.0 ± 0.2	✓		
R2A agar pH 7.2 ± 0.2			N/A
(For Pour Plate Method) melted agar tempered at 44-46°C in waterbath before pouring, held no longer than 3 hours, and melted only once	✓		

Element	Yes	No	Comments
(For Spread Plate Method) 15 mL of R2A medium or other medium poured into petri dish and solidified			N/A
Refrigerated medium in bottles or screw-capped tubes stored for up to 6 months, petri dishes with medium for up to 2 weeks (one week for R2A prepared petri dishes)	✓		
Countable plates obtained for most potable waters by plating 1.0 mL and/or 0.1 mL volume of undiluted sample	✓		
At least duplicate plates per dilution used	✓		
(For Pour Plate Method)			
Sample pipetted aseptically into bottom of petri dish and then 12-15 mL tempered melted agar added	✓		
Sample mixed with spillage avoided	✓		
After solidification on level surface, plates inverted and incubated at 35°C ± 0.5°C for 48 ± 3 hours	✓		
Plates stacked no more than four high	✓		
(For Spread Plate Method)			N/A
0.1 or 0.5 mL of sample or dilution pipetted onto surface of pre-dried agar plate and inoculum spread over entire agar surface using sterile bent glass rod			
Inoculum absorbed completely before plates inverted and incubated at 20-28°C for 5-7 days			
(For Membrane Filter Technique)			
Volume filtered to yield between 20-200 colonies			
Filter transferred to petri dish containing 5 mL solidified R2A medium and incubated at 20-28°C for 5-7 days			
Petri dishes with loose-fitting lids placed in container with close fitting lid and moistened paper towels			
Colonies counted using stereoscopic microscope at 10-15X magnification			
(For Pour Plate and Spread Plate Techniques)			
Colonies counted manually using dark field colony counter	✓		
Only plates with 30 to 300 colonies counted, except for plates inoculated with 1.0 mL of undiluted sample	✓		
Fully automatic colony counters not used	✓		CORRECT

Element	Yes	No	Comments
QC Medium sterility verified by pouring final control plate and data rejected if control contaminated	✓		
5.10 Membrane Filter Technique (for enumerating total coliforms in source water)			
Same as Section 5.2, Membrane Filter Technique (for total coliforms in drinking water), except invalidation does not apply	✓		
Appropriate sample dilutions used to yield 20 to 80 total coliform colonies per membrane	✓		
Initial counts adjusted based upon verified data	✓		
QC If two or more analysts available, each counts total coliform colonies on same membrane monthly and agree within 10%	✓		
5.11 Multiple Tube Fermentation Technique (for enumerating total coliforms in source water)			
At least three series of 5 tubes each with appropriate sample dilutions of source water used	—		N/A
Same as Section 5.3, Multiple Tube Fermentation Technique (for total coliforms in drinking water) except on sample invalidation	✓		
All samples invalidated which produce turbid growth in the absence of gas/acid production in LTB or LB and another sample obtained, which may be tested using another method	✓		
Alternatively, confirmed test performed on turbid culture in the absence of gas/acid production and, if total coliform-positive, most probable number reported, or if total coliform-negative, sample invalidated and another requested	✓		
5.12 Fecal Coliform Membrane Filter Procedure (for enumerating fecal coliforms in source water)			N/A
Medium			
m-FC broth (with or without agar) sterilized by bringing to boiling point, not autoclaved			
Medium final pH 7.4 ± 0.2			
Prepared medium refrigerated and broth discarded after 96 hours, poured agar medium in petri dishes after 2 weeks			
Uninoculated medium discarded if growth observed			
Sample volumes yield 20-60 fecal coliform colonies per membrane for at least one dilution			✓

Steps in 5.2 apply to 5.10

Element	Yes	No	Comments
QC Funnels rinsed with two or three 20-30 mL portions of sterile rinse water after each sample filtration to prevent carry-over			✓
QC Sterility checked at beginning and end of each filtration series and all data rejected from affected samples and resampling requested if controls contaminated			
Inoculated medium incubated at 44.5°C ± 0.2°C for 24 ± 2 hours			
QC If two or more analysts available, each counts fecal coliform colonies on same membrane monthly and counts agree within 10%			✓
6. SAMPLE COLLECTION, HANDLING, AND PRESERVATION			
6.1 Sample Collector			
Trained in aseptic sampling procedures and, if required, approved by appropriate regulatory authority or designated representative	?		*
6.2 Sampling			
Sample representative of water distribution system	?		*
Water taps used for sampling free of aerators, strainers, hose attachments, mixing type faucets, and purification devices	✓		In Instructions
Cold water tap used	✓		"
Service line cleared before sampling by maintaining steady water flow for at least 2 minutes	✓		"
At least 100 mL sample volume collected, allowing one inch air space in container	✓		
Sample information form completed immediately after sample collection	✓		
Source water representative of supply, collected not too far intake at a reasonable distance from shore	?		*
6.3 Sample Icing			
Samples held at < 10°C during transit to laboratory (recommended for drinking water) ~~required for source water~~ ERRATA		✓	
6.4 Sample Holding/Travel Time			
Time from sample collection to initiation of analysis for total coliforms, fecal coliforms, or *E. coli* does not exceed 30 hours for drinking water samples	✓		
Time from sample collection to initiation of analysis for total coliforms and fecal coliforms in source water and heterotrophic bacteria in drinking water does not exceed 8 hours		✓	exceedances of 8 hr HT for coliforms on source w.

*UNKNOWN; NOT IN INSTRUCTIONS

? SEE Report.

Element	Yes	No	Comments
All samples analyzed on day of receipt by laboratory, unless laboratory receives sample late in day and then refrigerates sample overnight and begins analysis within holding time	✓		
6.5 Sample Information Form			
Entered on sample information form in indelible ink: - name of system (PWSS identification number if available) - sample identification (if any) - sample site location - sample type (e.g. routine, repeat, raw or process) - date and time of collection - analysis required - disinfectant residual - name of sampler and organization (if not water system) - sampler's initials - person(s) transporting sample from system to laboratory (if not sampler) - transportation condition (e.g. < 10°C, protection from sunlight), if shipper used, shipping records available - any remarks	✓		
6.6 Chain-of-Custody			
Applicable regulations followed by collectors and laboratory	✓		
7. QUALITY ASSURANCE			
Written QA Plan prepared, followed, and available for inspection	✓	but	Incomplete
8. RECORDS AND DATA REPORTING			
8.1 Legal Defensibility			
Compliance monitoring data legally defensible by keeping thorough and accurate records	✓		
QA plan and/or SOPs describe policies and procedures used by facility for record retention and storage		✓	See Report
Chain-of-custody procedures used if samples expected to become part of legal action			?
8.2 Maintenance of Records			
Microbiological analyses records kept by or accessible to laboratory for at least 5 years or until next certification data audit completed, whichever is longer	✓		
Client water system notified before disposal of records			?
8.3 Sampling Records			

Element	Yes	No	Comments
Data recorded in ink with changes lined through such that original entry visible and changes initialed and dated	✓		
Sampling records include: - sample information form, from Section 6.5 - date and time of sample receipt by laboratory - name of laboratory person receiving sample - if any deficiency in sample condition noted, sample, at a minimum, flagged - if sample transit time exceeds 30 hours (8 hours for source water samples), sample tagged	✓		except if >30 hrs sample rejected, not analyzed!
8.4 Analytical Records			
Data recorded in ink with changes lined through such that original entry visible and with changes initialed and dated	✓		
Analytical records include: - laboratory sample identification - date and time analysis begins - laboratory and person(s) responsible for performing analysis - analytical technique or method used - all items marked QC - results of analysis	✓		
8.5 Preventive Maintenance			
Preventive maintenance and repair records for all instruments and equipment kept for 5 years	✓		
9. ACTION RESPONSE TO LABORATORY RESULTS			
9.1 Testing Total Coliform-Positive Cultures			
For the Total Coliform Rule, all total coliform positive cultures tested for presence of either fecal coliforms or *E. coli*	✓		
9.2 Notification of Positive Results			
For Total Coliform Rule, proper authority notified promptly by laboratory of positive total coliform, fecal coliform or *E. coli* results	✓		
Total coliform positive result based on confirmed phase for MTF Technique and P-A Coliform Test or verified test for MF Technique (no requirement for confirmation of positive Colilert/Colisure, fecal coliform or *E. coli* tests)	✓		
9.3 Invalidation of Total Coliform-Negative Sample			
For Total Coliform Rule, proper authority notified when results indicate non-coliforms may have interfered with total coliform analysis	✓		

ENVIRONMENTAL RESOURCE ASSOCIATES®

WS-37 Data Reporting Cover Sheet (copy)

29 Sep 1999

a) Enter your LABORATORY INFORMATION

CONTACT NAME: Wayne Morganroth	USEPA LAB CODE: WV00003
LAB NAME: Off Lab Svcs, Environmental Chemistry Lab	STATE LAB CODE 00003 C
ADDRESS: 4710 Chimney Drive, Suite G	PHONE # 1 (304) 558-0197
Charleston, WV 25302	FAX # 1 (304) 558-4143
CITY Charleston, ST WV ZIP 25302	EMAIL None

b) Enter your REGULATORY AGENCY INFORMATION

The price for your InterLaB™ study includes a report being sent to you and to your primary accrediting agency. Additional reports can be sent to other accrediting authorities at a cost of $10.00 per report. Please circle all accrediting agency(ies) that you are authorizing ERA to send copies of your InterLaB WatR™ Pollution, WS-37 study final report.

Alabama	Georgia	Louisiana	Nebraska	Oregon	Vermont
Alaska	Guam	Maine	Nevada	Pennsylvania	Virginia
Arkansas	Hawaii	Maryland	New Hampshire	Puerto Rico	Virgin Islands
Arizona	Idaho	Massachusetts	New Jersey	Rhode Island	Washington
California	Illinois	Michigan	New York	South Carolina	(West Virginia)
Colorado	Indiana	Minnesota	North Carolina	South Dakota	Wisconsin
Connecticut	Iowa	Mississippi	North Dakota	Tennessee	Wyoming
Delaware	Kansas	Missouri	Ohio	Texas	A2LA
Florida	Kentucky	Montana	Oklahoma	Utah	

c) Sign the ATTESTATION STATEMENT

Per the requirements of the USEPA's National Standards for Water Proficiency Testing Studies, please read this attestation statement. By affixing your signature below, you attest that your InterLaB™ WS-37 study results have met the following criteria. 1) The InterLaB™ WS-37 study standards for which you are submitting results were not analyzed by any other laboratory. 2) Your laboratory has not knowingly received InterLaB™ WS-37 study standards for analysis from any other laboratory. 3) No information was solicited from ERA or any other laboratories concerning the assigned values or acceptance ranges for InterLaB™ WS-37 study standards.

Official Laboratory Contact (signature) Wayne Morganroth

Official Laboratory Contact (please print) Wayne Morganroth Date: September 24, 1999

Return this sheet plus all "*WS-37 DATA REPORTING SHEET(S)*" to ERA by FAX or Mail.
Deadline for receipt of data is September 28, 1999.

Total Pages:_____ ERA will verify that all faxes are legible and complete. If there are any problems with your fax transmission, ERA will contact you immediately with any questions.

Questions? See the *WP DATA REPORTING INSTRUCTIONS* or call ERA at 1-800-372-0122

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WS-37 Metals Data Reporting Form

INSTRUCTIONS: Please fill in the results, method references, and analysis dates for the analyte(s) you wish to report for ERA's WS-37 PT Study and return to ERA as described in the WS-37 Data Reporting Instructions. Questions? Call ERA at 1-800-372-0122.

Customer: BUREAU OF PUBLIC HEALTH **Customer Code: W2134-01**

ERA Standard	Analyte	Result	Units	Method	Analysis Date
Metals	Aluminum	85.6	µg/l	SM3113B	9/2/99
	Antimony	33.5	µg/l	SM3113B	9/13/99
	Arsenic	11.6	µg/l	SM3113B	9/9/99
	Barium	221.0	µg/l	EPA200.7	9/15/99
	Beryllium	5.60	µg/l	SM3113B	9/1/99
	Boron		µg/l		/ /
	Cadmium	26.1	µg/l	SM3113B	9/1/99
	Calcium		mg/l		/ /
	Chromium	95.4	µg/l	SM3113B	9/2/99
	Copper	77.8	µg/l	SM3113B	8/31/99
	Iron	11.7	µg/l	SM3111B	9/8/99
	Lead	60.2	µg/l	SM3113B	8/31/99
	Manganese	31.2	µg/l	SM3111B	8/30/99
	Molybdenum		µg/l		/ /
	Nickel	17.6	µg/l	SM3113B	9/2/99
	Selenium	42.6	µg/l	SM3113B	9/10/99
	Silver		µg/l		/ /
	Thallium	4.99	µg/l	EPA200.9	9/14/99
	Zinc	56.8	µg/l	SM3111B	8/30/99
	*Hardness as $CaCO_3$		mg/l		/ /
Mercury	Mercury	2.00	µg/l	EPA245.1	9/21/99
Titration Hardness	Hardness as $CaCO_3$	146	mg/l	SM3500D	9/15/99

*The Hardness as $CaCO_3$ in the metals sample is amenable to analysis by ICP or Flame AA methodologies only. If you are using a titration method, please call ERA for a replacement standard for Titration Hardness as $CaCO_3$.

ENVIRONMENTAL RESOURCE ASSOCIATES® WS-37 Inorganic Data Reporting Form

INSTRUCTIONS: Please fill in the results, method references, and analysis dates for the analyte(s) you wish to report for ERA's WS-37 PT Study and return to ERA as described in the WS-37 Data Reporting Instructions. Questions? Call ERA at 1-800-372-0122.

Customer: BUREAU OF PUBLIC HEALTH **Customer Code: W2134-01**

ERA Standard	Analyte	Result	Units	Method	Analysis Date
pH	pH		S.U.		/ /
Inorganics	Bromide		mg/l		/ /
	Chloride	8.12	mg/l	EPA300.0	9/23/99
	Conductivity	365	µmhos	SM2510B	9/22/99
	Fluoride	4.54	mg/l	EPA300.0	9/23/99
	Nitrate as N	6.30	mg/l	EPA353.2	9/22/99
	Potassium		mg/l		/ /
	Sulfate	45.8	mg/l	EPA300.0	9/23/99
	Total Dissolved Solids	330	mg/l	EPA160.1	9/24/99
Alkalinity & Sodium	Alkalinity as $CaCO_3$		mg/l		/ /
	Sodium		mg/l		/ /
Turbidity	Turbidity	3.96	NTU	EPA180.1	9/16/99
Residual Chlorine	Free Residual Chlorine		mg/l		/ /
	Total Residual Chlorine		mg/l		/ /
Nitrite	Nitrite as N	1.69	mg/l	EPA353.2	9/22/99
Nutrients	ortho-Phosphate as P		mg/l		/ /
Cyanide	Cyanide		mg/l		/ /
TOC	TOC		mg/l		/ /
Chlorite	Chlorite		µg/l		/ /
Bromate & Chlorate	Bromate		µg/l		/ /
	Chlorate		µg/l		/ /

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QuiK™ Response PE Standard
Data Reporting Sheet

Corrosivity

Customer: **Bureau of Public Health**
Lot Number: **08059907**

Standard Preparation Instructions: None required; the standard is ready for analysis as received. The standard was manufactured and calculated as per Standard Methods 17th Edition 1985; Method #2330 "Calcium Carbonate Saturation". Saturation Index = pH - pH_s.

Parameter	Result	Units	Method	Analysis Date
PH	9.06	S.U.	EPA150.1	9/ 9/99
Alkaliniaty	343	mg/L	SM2320B	9/ 8/99
TDS	1001	mg/L	EPA160.1	9/24/99
Calcium	134	mg/L	SM3500D	9/ 8/99
Sodium	159	mg/L	SM3111B	9/ 9/99

Results reported by: Wayne Morganroth

EPA/State Lab ID#: WV00003

FAX number: 1 (304) 558-4143

Mail results to:
QuiK™ Response Data Reporting Group
Environmental Resource Associates
5540 Mashall Street
Arvada, CO 80002

FAX: **303-421-0159**

Single blind PE sample required for:

___ **Corrective Action for EPA WP**
_X_ **Corrective Action EPA WS**
___ **Corrective Action EPA DMRQA**
___ **State Certification (Initial or Renewal)**

TOTAL P.02

Performance Evaluation Report
USEPA Water Supply Study WS041

Participant ID: WV00003 Type: STATE Requesting Office: R03

Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
TRACE METALS IN MICROGRAMS PER LITER:				
143-THALLIUM				
001	3.34	3.50	2.45- 4.55	Accept.
NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:				
092-NITRITE AS N				
001	1.66	1.70	1.45- 1.96	Accept.
261-ORTHOPHOSPHATE AS P				
001	1.98	1.30	1.19- 1.39	Not Accept.
MISCELLANEOUS ANALYTES:				
145-SULFATE(MILLIGRAMS PER LITER)				
001	46.84	49.0	44.1- 54.2	Accept.

********** END OF DATA FOR WV00003 **********
NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.
********** END OF REPORT FOR WV00003 **********

* Based on gravimetric calculations, or a reference value when necessary.

Performance Evaluation Report
USEPA Water Supply Study WS039

Participant ID: WV00003 Type: STATE Requesting Office: R03

Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
TRACE METALS IN MICROGRAMS PER LITER:				
002-BARIUM				
001	1110	1100	935- 1270	Accept.
226-BORON				
002	643	599	573- 670	Accept.
NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:				
010-FLUORIDE				
001	2.84	2.90	2.61- 3.19	Accept.
MISCELLANEOUS ANALYTES:				
145-SULFATE(MILLIGRAMS PER LITER)				
001	434.0	490	440- 538	Not Accept.

********** END OF DATA FOR WV00003 **********
NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.
********** END OF REPORT FOR WV00003 **********

* Based on gravimetric calculations, or a reference value when necessary.

ENVIRONMENTAL RESOURCE ASSOCIATES®

WS-42 Final Report

ERA Laboratory Code: W2144-01 **EPA ID: WV00902 State ID: NA** **Report Issued: 03/30/00**

ERA Standard	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
Coliforms	Sample 1 Total Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 1 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 2 Total Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 2 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 3 Total Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 3 Fecal Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 4 Total Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 4 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 5 Total Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 5 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 6 Total Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 6 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 7 Total Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 7 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 8 Total Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 8 Fecal Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 9 Total Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 9 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM9223B
	Sample 10 Total Coliforms		Presence	Presence	Presence	Acceptable	SM9223B
	Sample 10 Fecal Coliforms		Presence	Presence	Presence	Acceptable	SM9223B

Total Evaluation for MicrobE™ (Coliforms) : Acceptable

Definitions:

- **Assigned Value:** 'Presence' indicates organisms of the coliform group are present in the sample, 'Absence' indicates organisms of the coliform group are not present in the sample as defined by standard water testing methods.

- **Fecal Coliform** organism - Escherichia coli — ATCC Strain #: 35421
  Samples - 3, 8, and 10

- **Total Coliform** organism - Enterobacter cloacae — ATCC Strain #: 35030
  Samples - 1, 6, and 9

- **Negative Coliform** organism - Proteus mirabilis — ATCC Strain #: 25933
  Samples - 2 and 5

- **Blank Samples**
  Samples - 4 and 7

NVLAP®

ENVIRONMENTAL RESOURCE ASSOCIATES®

WS-42 Definitions & Study Discussion

ERA Laboratory Code: W2144-01 EPA ID: WV00902 State ID: NA Report Issued: 03/30/00

InterLaB WatR™ SupplyDefinitions:

The **Reported Value** is the value that the laboratory reported to ERA.

The **ERA Assigned Values** are established per the USEPA's guidelines contained in the National Standards for Water Proficiency Criteria Document. December 1998 as applicable. A parameter not added to the standard is given an **Assigned Value** of **"Zero"** per the guidelines contained in the USEPA's Criteria Document.

The **Acceptance Limits** are established per the guidelines contained in the USEPA's National Standards for Water Proficiency Testing Criteria Document, December 1998 as applicable.

The **Performance Evaluation:**

Acceptable = Reported Value falls within the Acceptance Limits.

Not Acceptable = Reported Value falls outside the Acceptance Limits.

No Evaluation = Reported Values that can not be evaluated.

The **Method Description** is the method the laboratory reported to ERA.

D.L. equals the Detection Limit.

InterLaB WatR™ Supply Study Discussion:

ERA WatR™ Supply Proficiency Testing Study 42 has been reviewed by ERA Senior Management and certified compliant with the requirements of the USEPA's National Standards for Water Proficiency Testing Studies Criteria Document, December 1998, and those contained in the National Institute for Standards and Technologies Handbooks 150 and 150-19.

Per the requirements of the USEPA's Criteria Document and the NIST NVLAP Handbooks, the WatR™ Supply 42 (WS 42) results were examined for any study anomalies. A full review of all homogeneity, stability, and accuracy verification data was completed. All analytical verification data for all analytes in the WS 42 standards met the acceptance criteria contained in the US EPA's National Criteria Document for Water Proficiency Testing Studies, December 1998, and the National Voluntary Laboratory Accreditation Program, Handbook 150-19 for Chemical Calibration for Providers of Proficiency Testing, June 1999.

The data submitted by participating laboratories was also examined for study anomalies. There were two anomalies found during the review of the study data. These anomalies are listed on the next page.

If you have any questions regarding WatR™ Supply Study WS 42, please contact Shawn Kassner, InterLaB™ Program Coordinator, or Roland P. Bruggeman, InterLaB™ Chemist, at 1-800-372-0122.

NVLAP

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WS-43 Final Report

ERA Laboratory Code: W2144-01 **EPA ID: WV00902** **State ID:** **Report Issued: 05/01/00**

ERA Standard	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
Coliforms	Sample 1 Total Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 1 Fecal Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 2 Total Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 2 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 3 Total Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 3 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 4 Total Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 4 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 5 Total Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 5 Fecal Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 6 Total Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 6 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 7 Total Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 7 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 8 Total Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 8 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 9 Total Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 9 Fecal Coliforms		Absence	Absence	Absence	Acceptable	SM922B
	Sample 10 Total Coliforms		Presence	Presence	Presence	Acceptable	SM922B
	Sample 10 Fecal Coliforms		Presence	Presence	Presence	Acceptable	SM922B

MF

Total Evaluation for MicrobE™ (Coliforms) : Acceptable

Definitions:

- **Assigned Value:** 'Presence' indicates organisms of the coliform group are present in the sample, 'Absence' indicates organisms of the coliform group are not present in the sample as defined by standard water testing methods.

- **Fecal Coliform** organism - Escherichia coli — ATCC Strain #: 35421
  Samples - 1, 5, and 10

- **Total Coliform** organism - Enterobacter cloacae — ATCC Strain #: 35030
  Samples - 2, 4, and 9

- **Negative Coliform** organism - Proteus mirabilis — ATCC Strain #: 25933
  Samples - 6 and 7

- **Blank Samples**
  Samples - 3 and 8

NVLAP Lab code: 200366-0

ENVIRONMENTAL RESOURCE ASSOCIATES®

WS-43 Definitions & Study Discussion

ERA Laboratory Code: W2144-01 EPA ID: WV00902 State ID: Report Issued: 05/01/00

InterLaB WatR™ SupplyDefinitions:

The **Reported Value** is the value that the laboratory reported to ERA.

The **ERA Assigned Values** are established per the USEPA's guidelines contained in the National Standards for Water Proficiency Criteria Document, December 1998 as applicable. A parameter not added to the standard is given an **Assigned Value** of **"Zero"** per the guidelines contained in the USEPA's Criteria Document.

The **Acceptance Limits** are established per the guidelines contained in the USEPA's National Standards for Water Proficiency Testing Criteria Document, December 1998 as applicable.

The **Performance Evaluation:**

Acceptable = Reported Value falls within the Acceptance Limits.

Not Acceptable = Reported Value falls outside the Acceptance Limits.

No Evaluation = Reported Values that can not be evaluated.

The **Method Description** is the method the laboratory *reported to* ERA.

D.L. equals the Detection Limit.

InterLaB WatR™ Supply Study Discussion:

ERA WatR™ Supply Proficiency Testing Study 43 has been reviewed by ERA Senior Management and certified compliant with the requirements of the USEPA's National Standards for Water Proficiency Testing Studies Criteria Document, December 1998, and those contained in the National Institute for Standards and Technologies Handbooks 150 and 150-19.

Per the requirements of the USEPA's Criteria Document and the NIST NVLAP Handbooks, the WatR™ Supply 43 (WS 43) results were examined for any study anomalies. A full review of all homogeneity, stability, and accuracy verification data was completed. All analytical verification data for all analytes in the WS 43 standards met the acceptance criteria contained in the USEPA's National Criteria Document for Water Proficiency Testing Studies, December 1998, and the National Voluntary Laboratory Accreditation Program, Handbook 150-19 for Chemical Calibration for Providers of Proficiency Testing, June 1999.

The data submitted by participating laboratories was also examined for study anomalies. There were three anomalies found during the review of the study data. These anomalies are listed on the next page.

If you have any questions regarding WatR™ Supply Study WS 43, please contact Shawn Kassner, InterLaB™ Program Coordinator, or Curtis Wood, Quality Assurance Manager, at 1-800-372-0122.

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WS-41 Final Report

ERA Laboratory Code: W2144-01 **EPA ID: WV00902 State ID: NA** **Report Issued: 02/18/00**

ERA Standard	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
Coliforms	Sample 1 Total Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 1 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 2 Total Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 2 Fecal Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 3 Total Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 3 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 4 Total Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 4 Fecal Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 5 Total Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 5 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 6 Total Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 6 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 7 Total Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 7 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 8 Total Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 8 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 9 Total Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 9 Fecal Coliforms		Absence	Absence	Absence	Acceptable	9221B/E
	Sample 10 Total Coliforms		Presence	Presence	Presence	Acceptable	9221B/E
	Sample 10 Fecal Coliforms		Presence	Presence	Presence	Acceptable	9221B/E

MTF

Total Evaluation for MicrobE™ (Coliforms) : Acceptable

Definitions:

- **Assigned Value:** 'Presence' indicates organisms of the coliform group are present in the sample, 'Absence' indicates organisms of the coliform group are not present in the sample as defined by standard water testing methods.

- **Fecal Coliform** organism - Escherichia coli — ATCC Strain #: 35421
  Samples - 2, 4, and 10

- **Total Coliform** organism - Enterobacter cloacae — ATCC Strain #: 35030
  Samples - 3, 6, and 9

- **Negative Coliform** organism - Proteus mirabilis — ATCC Strain #: 25933
  Samples - 5 and 8

- **Blank Samples**
  Samples - 1 and 7

NVLAP®

ENVIRONMENTAL RESOURCE ASSOCIATES®

WS-41 Definitions & Study Discussion

ERA Laboratory Code: W2144-01 EPA ID: WV00902 State ID: NA Report Issued: 02/18/00

InterLaB WatR™ SupplyDefinitions:

The **Reported Value** is the value that the laboratory reported to ERA.

The **ERA Assigned Values** are established per the USEPA's guidelines contained in the National Standards for Water Proficiency Criteria Document, December 1998 as applicable. A parameter not added to the standard is given an **Assigned Value** of **"Zero"** per the guidelines contained in the USEPA's Criteria Document.

The **Acceptance Limits** are established per the guidelines contained in the USEPA's National Standards for Water Proficiency Testing Criteria Document, December 1998 as applicable.

The **Performance Evaluation:**

Acceptable = Reported Value falls within the Acceptance Limits.

Not Acceptable = Reported Value falls outside the Acceptance Limits.

No Evaluation = Reported Values that can not be evaluated.

The **Method Description** is the method the laboratory reported to ERA.

D.L. equals the Detection Limit.

InterLaB WatR™ Supply Study Discussion:

ERA WatR™ Supply Proficiency Testing Study 41 has been reviewed by ERA Senior Management and certified compliant with the requirements of the USEPA's National Standards for Water Proficiency Testing Studies Criteria Document, December 1998, and those contained in the National Institute for Standards and Technologies Handbooks 150 and 150-19.

Per the requirements of the USEPA's Criteria Document and the NIST NVLAP Handbooks, the WatR™ Supply 41 (WS 41) results were examined for any study anomalies. A full review of all homogeneity, stability, and accuracy verification data was completed. All analytical verification data for all analytes in the WS 41 standards met the acceptance criteria contained in the US EPA's National Criteria Document for Water Proficiency Testing Studies, December 1998, and the National Voluntary Laboratory Accreditation Program, Handbook 150-19 for Chemical Calibration for Providers of Proficiency Testing, June 1999.

The data submitted by participating laboratories was also examined for study anomalies. Based upon ERA's review of the data, all Acceptance Limits for the InterLaB WatR™ Supply study, WS41, were calculated based on the US EPA's National Criteria Document for Water Proficiency Testing Studies, December 1998, as applicable.

If you have any questions regarding WatR™ Supply Study WS 41, please contact Shawn Kassner, InterLaB™ Program Coordinator, or Roland P. Bruggeman, InterLaB™ Chemist, at 1-800-372-0122.

NVLAP® Lab code: 200305-0

ENVIRONMENTAL MICROBIOLOGY

February 18, 1999

To: Charlie Jones, Region III Coordinator
U.S.E.P.A. Region III
1650 Arch St.
Philadelphia, PA 19103-2029

From: Tom Ong, Microbiologist Supervisor
Laboratory Certification Officer

RE: Personnel Changes & Drinking Water Laboratory Certification Officer Course

As we discussed on the phone, the Drinking Water Microbiology Laboratory has undergone to following personnel changes:

1.

2. **Ex. 6 - Personal Privacy**

3.

As you can see I am in desperate need to have another analyst attend the Drinking Water Laboratory Certification Course to replace the loss of Mr. Vickers. We have quite a few on-site

evaluations to perform this year. I have selected the following analyst to attend the course:

A. Joyce Vance-Abshire
West Virginia Department of Health and Human Resources
Bureau for Public Health
OFFICE OF LABORATORY SERVICES
167 - 11th Avenue
South Charleston, WV 25303
Phone (304) 558-3530
Fax: (304) 558-2006

B. B.S. in Biology from the University of Charleston in 1986

C. Joyce has worked in the Drinking Water Microbiology Lab as a Microbiologist since 1993 and for the past 2 years has randomly attended joint on-site evaluations of State Certified Drinking Water Laboratories with myself.

D. I am requesting that she receive certification in Microbiology.

If you need any more information, let me know. Hope to see you sometime this year at a Regional Meeting.

II. NPDES (Microbiology)

On-Site Evaluation of Laboratory Involved in Analysis of National Pollution Discharge Elimination System Samples
Microbiology

Laboratory _____

Street _____

City _____ State _____

Telephone Number _____

Survey By _____

Affiliation _____

Date _____

Codes for Marking On-Site Evaluation Forms:
S-Satisfactory
X-Unsatisfactory
U-Undetermined
N-Not Applicable

...biology)

1.0 Personnel and Documentation

1.1

Position/Title	Name	Academic Training HS BA/BS MA/MS Ph.D.	Experience
Laboratory Director			
Quality Assurance Officer			
Laboratory Supervisor			
Laboratory Professional			
Laboratory Analysts			

Note: List all possible analysts for NPDES samples, including weekend coverage

Position/Title	Name	Academic Trining HS BA/BS MA/MS Ph.D	Experience
Sampling Director			
Sampling Supervisor			
Samplers			

1.2 Briefly describe the coordination activities between the laboratory and field operations.

1.3 Manuals: Please submit a current copy of each available manual mentioned below so that they may be reviewed prior to the on-site.

Laboratory QA/QC Manual
Microbiological SOP related to NPDES
Any other appropriate lab manuals
NPDES Sampling Manual appropriate to microbiology

1.4 Forms: Please submit a copy of each field and laboratory form used to record the handling of samples and associated QC operations

1.5 Microbiological Training:

Training Received in Microbiology: _____

Training Given in Microbiology Related Areas: _____

Microbiological Training Needs:

Lab: _____

Field: _____

1.6 Workload in NPDES for Microbiology: _____

1.7 Parameters Routinely Analyzed for NPDES Samples: _____

1.8 Average Numbers of NPDES Samples Analyzed Per Annum: _____

1.9 Quality Assurance:

Provide copies of results of PES analyses over the past two years: (Include information from all such Federal, State, and commercial evaluations)

Provide results of participation in Split Sample Analyses in microbiology over the past two years:

Provide copies of the most recent internal technical systems audit for microbiology.

Provide a self-appraisal by the lead microbiologist of the NPDES microbiology program featuring the strengths, weaknesses, equipment needs, and any additional information which would make this evaluation more meaningful. Current microbiology staff consists of one supervisor and two technicians dedicated to this area, who are very well trained, skillful and conscientious. Supporting staff are adequately trained.

2.0 Laboratory Facilities

Provide a brief description of current laboratory facilities addressing both the preparation and analytical areas. Facility located at 89 Kinge Highway, Dover, DE; is approximately 5 years old. Preparation and analytical areas combined except for autoclave; adequate space of current staff and workload.

3.0 Laboratory Equipment, Supplies, and Materials

3.1 pH Meter

Manufacturer Accumet (Fisher) Model 900

Accuracy, +/- 0.1 unit Yes
Scale graduation, 0.1 units Yes
Use pH buffer aliquot only once Yes
Standardize pH meter each use period w/pH 7.0 standard buffer Yes

3.2 Balance

Manufacturer Mettler Model P1000

Detects 100mg at a 150 g. load Yes
Calibrate balance performance using Class X wts. Occassionally not documen
Record Maintained
Service Contract or internal maintenance protocol
Record Maintained

3.3 Temperature Monitoring Device

Glass/mercury or dial thermometer used in incubator _____
units _____
Appropriate graduation increments for proper applications _____
No separation in mercury column _____
Check calibration of glass/mercury thermometer annually _____
and dial thermometer quarterly against NBS therm.
or one meeting NBS monograph 150 requirements. _____

3.4 Incubator

Manufacturer _____ Model _____

Maintains internal temperature of 35 +/- 0.5 degrees C _____
Thermometers placed on top and bottom shelves in use
area of non-portable incubators _____
Immerse thermometer bulb in liquid _____
Culture dishes and tubes fit snugly in aluminum block
incubator _____
Record temperature morning and afternoon in days in use _____

3.5 Waterbath

Manufacturer _____ Model _____

Maintains internal temperature at 44.5 +/- 0.2 degrees C _____
Thermometer placed in use areas _____
Bulb properly immersed _____
Culture dishes held beneath water surface _____
Record temperature morning and afternoon for days in use _____

3.6 Autoclave

Manufacturer _____ Model _____

Temperature gauge with sensor on exhaust _____
Operational safety valve _____
Maintains sterilization temperature during cycle _____
Completes entire cycle within 45 minutes when a 12-15 minute
sterilization period is used _____
Depressurizes sufficiently slowly to insure media do not boil
over and bubbles do not form in fermentation tubes _____
Approval of pressure cookers and vertical autoclaves requires
QC data demonstrating sterility and proper media reactions
Record date, sterilization time, and temperature for each
cycle _____
Establish service contract or internal maintenance protocol _____

3.7 Conductivity Meter

Manufacturer _____ Model _____

Graduated in ohms or mhos; range of 2 ohms to 2 megohms or
equivalent michromhos +/- 1%; sensitivity of 0.33% or
better _____

3.7 Refrigerator

Maintain temperature at 1°C to 5°C
Thermometer graduated in 1° increments
Immerse thermometer bulb in liquid
QC Record temperature for days in use

3.8 Inoculating Equipment

Metal or plastic loops, or dry heat sterilized applicator sticks

3.9 Membrane Filtration Equipment

Manufacturer _____ Type _____

Stainless steel, glass or autoclavable plastic
Units non-leaking, unscratched, not corroded
10 to 15X magnification device with fluorescent light source
Forceps, tips without corrugations

3.10 Membrane Filters and Pads

Manufacturer _____ Type _____

Made from cellulose ester material, white, gridmarked, 47 mm diameter, 0.45 um pore size
Alternate pore size used
Membranes recommended by manufacturer for total coliform water analysis
Membranes and pads are presterilized or autoclaved

3.11 Culture Dishes

Presterilized plastic or sterilized glass dishes used
Loose-lid dishes incubated in a tight-fitting container
Glass culture dishes are sterilized in stainless steel or aluminum canisters or in heavy aluminum foil or char-resistant paper
Open packs of disposable culture dishes are resealed between uses

3.12 Pipets

Glass pipets sterilized in stainless steel or aluminum canisters or individual pipets wrapped in char-resistant paper
Reseal packs of disposable sterile pipets between major use periods
Pipets not etched, mouthpiece and tip are not chipped, graduation markings legible

3.13 Culture Tubes and Closures

Tubes are borosilicate glass or other corrosion-resistant glass
Culture tubes are of sufficient size that medium plus sample does not exceed 3/4 full
Closures are stainless steel, plastic, aluminum, or loosened screw caps with non-toxic liner

3.14 Sample Containers

Capacity at least 120 mL (4 oz.)
Wide-mouth plastic or glass bottle with screw cap or non-corrosive glass bottle with ground glass stopper
Non-toxic liner in screw caps
Glass-stoppered bottle top covered with aluminum foil or char-resistant paper before sterilization

3.15 Glassware and Plasticware

Glass made of borosilicate or other corrosive-resistant glass
Free of chips and cracks
Graduation marks are legible
Plastic items are clear and non-toxic
Graduated cylinders used to measure sample volume have a 2.5% tolerance or better
Pipets used to measure sample volumes have a 2.5% tolerance or better

>oratory _____ Evaluator _____

:ation _____ Date _____

General Laboratory Practices

4.1 Autoclave Sterilization Procedures at 121°C

Item	Time	
Membrane filter and pads	10 min	
Carbohydrate media	12-15 min	
Contaminated test materials	30 min	
Membrane filter assemblies	15 min	
Sample collection bottles	15 min	
Individual glassware	15 min	
Dilution water blanks	15 min	
Rinse water	15 min	

Autoclaved MF filters and pads and all media are removed immediately after sterilization cycle _____

Membrane filter assemblies are sterilized at start of each filtration series _____

4.2 Sample Containers

Sodium thiosulfate added to sample containers before sterilization _____

QC At least one bottle per batch checked for sterility _____

4.3 Laboratory Pure Water

Laboratory pure water is used to prepare media, reagents, and dilution/rinse water _____

QC Requirements for laboratory pure water: _____

Parameters	Frequency	
(a) conductivity of >0.5 megohms or <2 micromhos at 25°C	Monthly	
(b) total chlorine residual non-detectable	Monthly	
(c) test for bacteriological quality for laboratory pure water, ratio of 0.8-3.0	Annually	

4.4 Dilution/Rinse Water

Stock buffer prepared according to Standard Methods and/or EPA Manual 600/8-78-017 _____

Stock buffer autoclaved or filter sterilized, labeled, and dated, and stock buffer free of turbidity _____

Dilution/rinse water is prepared by adding 1.25 mL of stock buffer solution and 5mL of $MgCl_2$ solution per liter of laboratory pure water _____

QC pH of stock buffer solution is 7.2 ± 0.2 _____

QC pH dilution/rinse water 7.2 ± 0.2, adjust pH if necessary _____

QC Rinse water checked for sterility _____

4.5 Glassware Washing

Distilled or deionized water used for final rinse _____

QC Inhibitory residue test performed on clean glassware _____

4.6 Media (General Needs)

Commercially prepared dehydrated media used _____

Dehydrated media stored in cool, dry location _____

Check media pH, adjust if necessary _____

QC Record for media prepared: _____

(a) date of preparation _____
(b) type of medium _____
(c) lot number _____
(d) sterilization time and temperature _____
(e) final pH _____
(f) technician's initials _____

4.7 Membrane Filter Media (include confirmatory media):

List media types employed for NPDES and average final pH values:

Complete media preparation log maintained _____
Dehydrated media routinely surveyed for caking _____
Media ordered in appropriate lot sizes for prompt use _____
Method of heating media _____
Use only ethanol _____
Membrane filter broth refrigerated no longer than 96 hours _____
Membrane filter agar refrigerated no longer than 2 weeks _____
Ampouled m-Endo broth refrigerated in accord with manufacturer's expiration date _____

4.8 MPN Media (include confirmatory media):

List media types used for NPDES analyses with average final pHs:

Broth medium dispensed in volumes not less than 3 months _____
MPN media in tubes with loose-fitting closures used within one week _____
MPN media in screw cap tubes stored no longer than three months; discarded if evaporation exceeds 10% of original volume _____
Overnight incubation at 35 degrees C of refrigerated sterilized MPN media _____

4.9 Heterotrophic Plate Count Agar

List all media used with average final pH values _____

Detail the temperature and length of incubation _____

Temper melted agar (44 to 46 degrees C) before pouring _____
Melted agar held no longer than eight hours _____
Do not melt sterile medium more than once _____
Autoclave at 121 degrees C for 15 minutes, time adjusted for volume _____

5.0 Analytical Methodology

5.1 List analytical methodologies applied to NPDES Samples including specific literature reference. _____

5.2 Approval for tentative and alternate methods and other modifications received from the Alternate Test Procedure Program _____

5.3 Describe how sample volumes to be examined are determined _____

5.4 Describe the routine application of confirmation, completion and verification applied to NPDES samples _____

6.0 Sample Collection, Handling and Preservation

6.1 Compliance with state chain of custody regulations _____
6.2 Date and time of sample arrival at laboratory are recorded, _____ date and time analysis begins are recorded _____
6.3 Sample transit time does not exceed 6 hours _____
6.4 Sample transit time plus analytical processing time prior to incubation does not exceed 8 hours _____
6.5 All NPDES samples received after 6 hours transit time are rejected and new samples requested _____

X. (Microbiology)

oratory _____ Evaluator _____

ation _____ Date _____

General Laboratory Practices

4.1 Autoclave Sterilization Procedures at 121°C

Item	Time	
Membrane filter and pads	10 min	
Carbohydrate media	12-15 min	
Contaminated test materials	30 min	
Membrane filter assemblies	15 min	
Sample collection bottles	15 min	
Individual glassware	15 min	
Dilution water blanks	15 min	
Rinse water	15 min	

Autoclaved MF filters and pads and all media are removed immediately after sterilization cycle _____

Membrane filter assemblies are sterilized at start of each filtration series _____

4.2 Sample Containers

Sodium thiosulfate added to sample containers before sterilization _____

QC At least one bottle per batch checked for sterility _____

4.3 Laboratory Pure Water

Laboratory pure water is used to prepare media, reagents, and dilution/rinse water _____

QC Requirements for laboratory pure water: _____

Parameters	Frequency	
(a) conductivity of >0.5 megohms or <2 micromhos at 25°C	Monthly	
(b) total chlorine residual non-detectable	Monthly	
(c) test for bacteriological quality for laboratory pure water, ratio of 0.8-3.0	Annually	

4.4 Dilution/Rinse Water

Stock buffer prepared according to Standard Methods and/or EPA Manual 600/8-78-017 _____

Stock buffer autoclaved or filter sterilized, labeled, and dated, and stock buffer free of turbidity _____

Dilution/rinse water is prepared by adding 1.25 mL of stock buffer solution and 5mL of $MgCl_2$ solution per liter of laboratory pure water _____

QC pH of stock buffer solution is 7.2 ± 0.2 _____

QC pH dilution/rinse water 7.2 ± 0.2, adjust pH if necessary _____

QC Rinse water checked for sterility _____

4.5 Glassware Washing

Distilled or deionized water used for final rinse _____

QC Inhibitory residue test performed on clean glassware _____

4.6 Media (General Needs)

Commercially prepared dehydrated media used _____

Dehydrated media stored in cool, dry location _____

Check media pH, adjust if necessary _____

QC Record for media prepared:

(a) date of preparation _____
(b) type of medium _____
(c) lot number _____
(d) sterilization time and temperature _____
(e) final pH _____
(f) technician's initials _____

4.7 Membrane Filter Media (include confirmatory media):

List media types employed for NPDES and average final pH values:

Complete media preparation log maintained _____
Dehydrated media routinely surveyed for caking _____
Media ordered in appropriate lot sizes for prompt use _____
Method of heating media _____
Use only ethanol _____
Membrane filter broth refrigerated no longer than 96 hours _____
Membrane filter agar refrigerated no longer than 2 weeks _____
Ampouled m-Endo broth refrigerated in accord with manufacturer's expiration date _____

4.8 MPN Media (include confirmatory media):

List media types used for NPDES analyses with average final pHs:

Broth medium dispensed in volumes not less than 3 months _____
MPN media in tubes with loose-fitting closures used within one week _____
MPN media in screw cap tubes stored no longer than three months; discarded if evaporation exceeds 10% of original volume _____
Overnight incubation at 35 degrees C of refrigerated sterilized MPN media _____

4.9 Heterotrophic Plate Count Agar

List all media used with average final pH values _____

Detail the temperature and length of incubation _____

Temper melted agar (44 to 46 degrees C) before pouring _____
Melted agar held no longer than eight hours _____
Do not melt sterile medium more than once _____
Autoclave at 121 degrees C for 15 minutes, time adjusted for volume _____

5.0 Analytical Methodology

5.1 List analytical methodologies applied to NPDES Samples including specific literature reference. _____

5.2 Approval for tentative and alternate methods and other modifications received from the Alternate Test Procedure Program _____

5.3 Describe how sample volumes to be examined are determined _____

5.4 Describe the routine application of confirmation, completion and verification applied to NPDES samples _____

6.0 Sample Collection, Handling and Preservation

6.1 Compliance with state chain of custody regulations _____
6.2 Date and time of sample arrival at laboratory are recorded, _____ date and time analysis begins are recorded _____
6.3 Sample transit time does not exceed 6 hours _____
6.4 Sample transit time plus analytical processing time prior to incubation does not exceed 8 hours _____
6.5 All NPDES samples received after 6 hours transit time are rejected and new samples requested _____

H. Indicate the approximate number of samples analyzed:

	Approximate number of Samples/Year	Approximate % of Laboratory Workload/Yr
SDWA:	2 ~~996~~ (Average of the last fiscal years)	100%
NPDES:		
RCRA:		
Superfund:		
Other Monitoring:		

State Laboratory SDWA and NPDES Pre-Survey Package

Date: _____

I. General Information

A. Name of Laboratory: WV Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services

B. Address: 167-11th Avenue
South Charleston WV 25303

C. Telephone Number: (304) 558 3530

D. Name of Laboratory Director: Frank Lambert, Jr., Dr. PH.

E. Provide an organizational chart of the laboratory, including any field operations or other internal affiliations to show how the laboratory fits into the general organizational structure.
Indicate SDWA and NPDES related portions of the laboratory organization.

F. List names of principal users of services of the laboratory.

Public Water Supplies
Private Individuals
County Health Depts
Bottled Water Companies
State Senatadors & Engineers
Private Contractors

G. List laboratory support provided by commercial laboratories, and other State or Federal laboratories.

II. Personnel

Lab Name WV Office of Laboratory Services

Please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility.

Date 7-7-99 No. ____ of ____ pages

Name	Training: Degree (Circle One)	Training: Major	Position	Years of Experience: Present Job	Years of Experience: Previous Job	Identify Current Analyses Performed in Support of: SDWA	Identify Current Analyses Performed in Support of: NPDES
(O) Frank Fomperd, Jr.	Ph.D. DrPH / MS / BS/BA / Assoc. / HS						
Thomas L. Ong	Ph.D. / MS / (BS)/BA / Assoc. / HS	Biology	Microbiologist Supervisor	3	7	Total Coliform, Fecal Coliform, Ecoli HPC, Lab Certification	
Joyce Vance-Abshire	Ph.D. / MS / (BS)/BA / Assoc. / HS		Microbiologist ~~III~~ II	6		↓	
Mike Flesher	Ph.D. / MS / BS/(BA) / (Assoc.) / HS	BA - Education Biology; A.S. - Science	Microbiologist II	5 3/4		Total Coliform, Fecal Coliform, Ecoli HPC	
Tracy Bossle	Ph.D. / MS / (BS)/BA / Assoc. / HS	Biology	Microbiologist I	3mo.			
Joe Cochran	Ph.D. / MS / (BS)/BA / Assoc. / HS	Chemistry ACS-Certified	Laboratory Assistant II	8 mo.			
~~N Asst.~~ Micah Moore	B.A.	Chemistry	Laboratory Assistant II	2 mo		↓	

ook of ASTM Standards, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916
t, Philadelphia, PA 19103.
Methods for the Examination of Water and Wastewater, 18th Edition, 1992, American Public Health
n, 1015 Fifteenth Street NW, Washington, D.C. 20005.
s for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111,
. Available at NTIS, PB94-184942.
ls for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100,
93. Available at NTIS, PB94-121811.
al Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-
Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY

le from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425,
CO 80225-0425.

Table IV-6 Recommended Methods for Secondary Drinking Water Contaminants

Analyses of aluminum, chloride, color, copper, fluoride, foaming agents, iron, manganese, odor, silver, sulfate, total dissolved solids (TDS) and zinc to determine compliance under §143.3 may be conducted with the methods in the following Table. Criteria for analyzing aluminum, copper, iron, manganese, silver, and zinc samples with digestion or directly without digestion, and other mandatory procedures are contained in the Technical Notes in Section IV of this document. Measurement of pH may be conducted with one of the methods listed above in Section I under "Methods for Inorganic Chemicals."

Contaminant	EPA	ASTM[1]	SM[2]	Other
Aluminum	200.7[3]		3120B	
	200.8[3]		3113B	
	200.9[3]		3111D	
Chloride	300.0[4]	D4327-91	4110B	
			4500-Cl^--D	
Color			2120B	
Foaming Agents			5540C	
Iron	200.7[3]		3120B	
	200.9[3]		3111B	
			3113B	
Manganese	200.7[3]		3120B	
	200.8[3]		3111B	
	200.9[3]		3113B	
Odor			2150B	
Silver	200.7[3]		3120B	I-3720-85[6]
	200.8[3]		3111B	
	200.9[3]		3113B	
Sulfate	300.0[4]	D4327-91	4110B	
	375.2[4]		4500-SO_4-F	
			4500-SO_4-C,D	
TDS			2540C	
Zinc	200.7[3]		3120B	
	200.8[3]		3111B	

Table IV-6 Recommended Methods for Secondary Drinking Water Contaminants

Analyses of aluminum, chloride, color, copper, fluoride, foaming agents, iron, manganese, odor, silver, sulfate, total dissolved solids (TDS) and zinc to determine compliance under §143.3 may be conducted with the methods in the following Table. Criteria for analyzing aluminum, copper, iron, manganese, silver, and zinc samples with digestion or directly without digestion, and other mandatory procedures are contained in the Technical Notes in Section IV of this document. Measurement of pH may be conducted with one of the methods listed above in Section I under "Methods for Inorganic Chemicals."

Contaminant	EPA	ASTM[1]	SM[2]	Other
Aluminum	200.7[3]		3120B	
	200.8[3]		3113B	
	200.9[3]		3111D	
Chloride	300.0[4]	D4327-91	4110B	
			4500-Cl^--D	
Color			2120B	
Foaming Agents			5540C	
Iron	200.7[3]		3120B	
	200.9[3]		3111B	
			3113B	
Manganese	200.7[3]		3120B	
	200.8[3]		3111B	
	200.9[3]		3113B	
Odor			2150B	
Silver	200.7[3]		3120B	I-3720-85[6]
	200.8[3]		3111B	
	200.9[3]		3113B	
Sulfate	300.0[4]	D4327-91	4110B	
	375.2[4]		4500-SO_4-F	
			4500-SO_4-C,D	
TDS			2540C	
Zinc	200.7[3]		3120B	
	200.8[3]		3111B	

"Unregulated" Inorganic Contaminants	Methods EPA	ASTM	SM
Nickel	200.7		3120B
	200.8		
	200.9		
			3111B
			3113B
Sulfate	300.0	D4327-91	4110B
	375.2		4500-SO_4-F
			4500-SO_4-C,D

*A Standard Methods method.

Sources for the Standard Methods and ASTM sulfate methods are referenced above under methods for inorganic chemicals. The EPA methods are contained in "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993, which is available at NTIS, PB94-121811.

ıte Discretionary Contaminants	METHODS
t-Butylbenzene	502.2, 524.2
ichlorodifluoromethane	502.2, 524.2
luorotrichloromethane	502.2, 524.2
lexachlorobutadiene	502.2, 524.2
sopropylbenzene	502.2, 524.2
ɔ-Isopropyltoluene	502.2, 524.2
Naphthalene	502.2, 524.2
n-Propylbenzene	502.2, 524.2
1,2,3-Trichlorobenzene	502.2, 524.2
1,2,4-Trimethylbenzene	502.2, 524.2
1,3,5-Trimethylbenzene	502.2, 524.2

Analysis for the 13 unregulated SOCs listed under paragraph (n)(11) of §141.40 shall be conducted using the following recommended methods.

"Unregulated" SOC Contaminants	Methods
Aldicarb	531.1, 6610*
Aldicarb sulfone	531.1; 6610*
Aldicarb sulfoxide	531.1, 6610*
Aldrin	505, 508, 525.2, 508.1
Butachlor	507, 525.2
Carbaryl	531.1, 6610*
Dicamba	515.1, 515.2, 555
Dieldrin	505, 508, 525.2, 508.1
3-Hydroxycarbofuran	531.1, 6610*
Methomyl	531.1, 6610*
Metolachlor	507, 525.2, 508.1
Metribuzin	507, 525.2, 508.1
Propachlor	508, 525.2, 508.1

Analysis for the unregulated inorganic contaminant listed under paragraph (n)(12) of §141.40 shall be conducted using the following recommended methods.

Table IV-4 Approved Methods for "Unregulated" Contaminants (§141.40)

Regulations specified in §141.40 require monitoring for certain contaminants to which maximum contaminant levels do not apply. These chemicals are called "unregulated" contaminants, and presently include sulfate, 34 volatile organic chemicals (VOCs) and 13 synthetic organic chemicals (SOCs).

Analysis for the 34 unregulated VOCs listed under paragraphs (e) and (j) of §141.40 shall be conducted using the following recommended methods, or their equivalent as determined by EPA.

"Unregulated" VOC Contaminants	Method
Chloroform	502.2, 524.2, 551
Bromodichloromethane	502.2, 524.2, 551
Bromoform	502.2, 524.2, 551
Chlorodibromomethane	502.2, 524.2, 551
Bromobenzene	502.2, 524.2
Bromomethane	502.2, 524.2
Chloroethane	502.2, 524.2
Chloromethane	502.2, 524.2
o-Chlorotoluene	502.2, 524.2
p-Chlorotoluene	502.2, 524.2
Dibromomethane	502.2, 524.2
m-Dichlorobenzene	502.2, 524.2
1,1-Dichloroethane	502.2, 524.2
1,3-Dichloropropane	502.2, 524.2
2,2-Dichloropropane	502.2, 524.2
1,1-Dichloropropene	502.2, 524.2
1,3-Dichloropropene	502.2, 524.2
1,1,2,2-Tetrachloroethane	502.2, 524.2
1,1,1,2-Tetrachloroethane	502.2, 524.2
1,2,3-Trichloropropane	502.2, 524.2, 504.1

State Discretionary Contaminants	METHODS
Bromochloromethane	502.2, 524.2
n-Butylbenzene	502.2, 524.2
sec-Butylbenzene	502.2, 524.2

Supplement I, EPA-600-4-90-020, July 1990. Methods 515.2, 524.2, 548.1, 549.1, 552.1 and 555 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement II, EPA-600/R-92-129, August 1992. Method 1613, Tetra-Through Octa- Chlorinated Dioxins and Furans by Isotopic Dilution HRGC/HRMS, EPA-81/B-94-003, October 1994 These documents are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027 and PB92-207703 and PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Method 1613 is available from USEPA Office of Water Resource Center (RC-4100), 401 M. Street S.W., Washington, D.C. 20460. The phone number is 202-260-7786. EPA Methods 504.1, 508.1 and 525.2 are available from US EPA NERL, Cincinnati, OH 45268. The phone number is (513)-569-7586. Method 6651 is contained in the 18th edition of *Standard Methods for the Examination of Water and Wastewater*, 1992, and Method 6610 is contained in the *Supplement to the 18th edition of Standard Methods for the Examination of Water and Wastewater*, 1994, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

Contaminant	Method[3]
Dalapon	515.1, 552.1
Di(2-ethylhexyl)adipate	506, 525.2
Di(2-ethylhexyl)phthalate	506, 525.2
Dibromochloropropane (DBCP)	504.1, 551
Dinoseb	515.2,515.1, 555
Diquat	549.1
Endothall	548.1
Endrin	505, 508, 508.1, 525.2
Ethylene dibromide (EDB)	504.1, 551
Glyphosate	547, 6651
Heptachlor	505, 508, 508.1, 525.2
Heptachlor Epoxide	505, 508, 508.1, 525.2
Hexachlorobenzene	505, 508, 508.1, 525.2
Hexachlorocyclopentadiene	505, 508, 508.1, 525.2
Lindane	505, 508, 508.1, 525.2
Methoxychlor	505, 508, 508.1, 525.2
Oxamyl	531.1, 6610
PCBs (as decachlorobiphenyl)[2] (as Aroclors)	508A 505, 508
Pentachlorophenol	515.1, 515.2, 525.2, 555
Picloram	515.1, 515.2, 555
Simazine	505[1], 507, 508.1, 525.2
2,4,5-TP (Silvex)	515.1, 515.2, 555
Toxaphene	505, 508, 525.2
Total Trihalomethanes	502.2, 524.2, 551

[1] A nitrogen-phosphorous detector should be substituted for the electron capture detector in Method 505 (or another approved method should be used) to determine alachlor, atrazine and simazine, if lower detection limits are required.

[2] PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl using Method 508A.

[3] Methods 502.2, 505, 507, 508, 508A, 515.1 and 531.1 are in Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991. Methods 506, 547, 550, 550.1 and 551 are in Methods for the Determination of Organic Compounds in Drinking Water -

Table IV-3 Approved Methods for Primary Organic Chemicals [§141.24(e)]

Contaminant	Method[3]
Benzene	502.2, 524.2
Carbon tetrachloride	502.2, 524.2, 551
Chlorobenzene	502.2, 524.2
1,2-Dichlorobenzene	502.2, 524.2
1,4-Dichlorobenzene	502.2, 524.2
1,2-Dichloroethane	502.2, 524.2
cis-1,2-Dichloroethylene	502.2, 524.2
trans-1,2-Dichloroethylene	502.2, 524.2
Dichloromethane	502.2, 524.2
1,2-Dichloropropane	502.2, 524.2
Ethylbenzene	502.2, 524.2
Styrene	502.2, 524.2
Tetrachloroethylene	502.2, 524.2, 551
1,1,1-Trichloroethane	502.2, 524.2, 551
Trichloroethylene	502.2, 524.2, 551
Toluene	502.2, 524.2
1,2,4-Trichlorobenzene	502.2, 524.2
1,1-Dichloroethylene	502.2, 524.2
1,1,2-Trichloroethane	502.2, 524.2
Vinyl chloride	502.2, 524.2
Xylenes (total)	502.2, 524.2
2,3,7,8-TCDD (dioxin)	1613
2,4-D	515.2, 515.1, 555
Alachlor	505[1], 507, 508.1, 525.2
Atrazine	505[1], 507, 508.1, 525.2
Benzo(a)pyrene	525.2, 550, 550.1
Carbofuran	531.1, 6610
Chlordane	505, 508, 508.1, 525.2

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other
	Auto. molybdate reactive silica			4500-Si F	
	ICP	200.7[2]		3120B	
Temperature	Thermometric			2550B	
Sodium	ICP	200.7[2]			
	AA-Direct			3111B	
Turbidity	Nephelometric[6]	180.1		2130B	GLI Method 2[12]

FOOTNOTES

1 Methods 150.1, 150.2 and 245.2 are available from US EPA, EMSL, Cincinnati, OH 45268. The identical methods were formerly in "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1983.

2 "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB 94-184942.

3 *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

4 *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

5 Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

6 "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

7 Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water," July 1994, PN 221890-001, ATI Orion, 529 Main Street, Boston, MA 02129. This method is identical to Orion WeWWG/5880, which is approved for nitrate analysis. ATI Orion republished the method in 1994, and renumbered it as 601, because the 1985 manual "Orion Guide to Water and Wastewater Analysis," which contained WeWWG/5880, is no longer available.

8 Method B-1011, "Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography," Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

9 Method 100.1, "Analytical Method for Determination of Asbestos Fibers in Water," EPA-600/4-83-043, EPA, September 1983. Available at NTIS, PB 83-260471.

10 Method 100.2, "Determination of Asbestos Structure Over 10-μm In Length in Drinking Water," EPA-600/R-94-134, June 1994. Available at NTIS, PB 94-201902.

11 Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY 10591.

12 GLI Method 2, "Turbidity," November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223

	SM[4]	Other
	3113B	
	3113B	
	3111B	
	3120B	
	4500-H^+-B	
1A	2510B	
A	3500-Ca-D	
B	3111B	
	3120B	
92B	2320B	
		I-1030-85[5]
	4500-P-F	
88A	4500-P-E	
		I-1601-85[5]
		I-2601-90[5]
		I-2598-85[5]
7-91	4110	
		I-1700-85[5]
		I-2700-85[5]
9-88		
	4500-Si-D	
	4500-Si-E	

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other
Cyanide	Man. Distillation followed by:			4500-CN-C	
	Spec., Amenable		D2036-91B	4500-CN-G	
	Spec.Manual		D2036-91A	4500-CN-E	I-3300-85[5]
	Semi-auto	335.4[6]			
	Ion Sel. Elec.(ISE)			4500CN-F	
Fluoride	Ion Chromatography	300.0[6]	D4327-91	4110B	
	Manual Distill. SPADNS			4500F-B,D	
	Manual ISE		D1179-93B	4500F-C	
	Automated ISE				380-75WE[11]
	Auto. Alizarin			4500F-E	129-71W[11]
Mercury	Manual Cold Vapor	245.1[2]	D3223-91	3112B	
	Auto. Cold Vapor	245.2[1]			
	ICP-MS	200.8[2]			
Nitrate	Ion Chromatography	300.0[6]	D4327-91	4110B	B-1011[8]
	Auto Cd Reduction	353.2[6]	D3867-90A	4500-NO_3-F	
	Ion Selective Elec.			4500-NO_3-D	601[7]
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
Nitrite	Ion Chromatography	300.0[6]	D4327-91	4110B	B-1011[8]
	Auto Cd Reduction	353.2[6]	D3867-90A	4500-NO_3-F	
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
	Spectrophotometric			4500-NO_2-B	
Selenium	Hydride-AA		D3859-93A	3114B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
	AA-Furnace		D3859-93B	3113B	
Thallium	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			

or Fill in "other"

ods for Primary Inorganic Chemicals, Parameters in the Lead and Copp
y [§141.23(k)(1)]

odology	EPA	ASTM[3]	SM[4]	O
MS	200.8[2]			
ide-AA		D3697-92		
Platform	200.9[2]			
Furnace			3113B	
	200.7[2]		3120B	
-MS	200.8[2]			
-Platform	200.9[2]			
-Furnace		D2972-93C	3113B	
dride-AA		D2972-93B	3114B	
EM	100.1[9]			
EM	100.2[10]			
CP	200.7[2]		3120B	
CP-MS	200.8[2]			
AA-Direct			3111D	
AA-Furnace			3113B	
ICP	200.7[2]		3120B	
ICP-MS	200.8[2]			
AA-Platform	200.9[2]			
AA-Furnace		D3645-93B	3113B	
ICP	200.7[2]			
ICP-MS	200.8[2]			
AA-Platform	200.9[2]			
AA-Furnace			3113B	
ICP	200.7[2]		3120B	
ICP-MS	200.8[2]			
AA-Platform	200.9[2]			
AA-Furnace			3113B	

Parameter/ Method	Preservative	Sample Holding Time	Extract Holding Time	Suggested Sample Size	Type of Container
Temperature	none	immediately		1 L	Plastic or Glass
Turbidity	Cool, 4C	48 hours		100 mL	Plastic or Glass
502.2	Sodium Thiosulfate or Ascorbic Acid, 4C, HCl pH<2	14 days		40-120 mL	Glass with Teflon Lined Septum
504.1	Sodium Thiosulfate Cool, 4C,	14 days	4C, 24 hours	40 mL	Glass with Teflon Lined Septum
505	Sodium Thiosulfate Cool, 4C	14 days (7 days for Heptachlor)	4C, 24 hours	40 mL	Glass with Teflon Lined Septum
506	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 14 days	1 L	Amber Glass with Teflon lined Cap
507	Sodium Thiosulfate Cool, 4C, Dark	14 days(see method for exceptions)	4C, dark 14 days	1 L	Amber Glass with Teflon Lined Cap
508	Sodium Thiosulfate Cool, 4C, Dark	7 days (see method for exceptions)	4C, dark 14 days	1 L	Glass with Teflon Lined Cap
508A	Cool, 4C	14 days	30 days	1 L	Glass with Teflon Lined Cap
508.1	Sodium Sulfite HCl pH<2 Cool, 4C	14 days (see method for exceptions)	30 days	1 L	Glass with Teflon Lined Cap
515.1	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 28 days	1 L	Amber Glass with Teflon Lined Cap
515.2	Sodium Thiosulfate HCl pH<2 Cool, 4C, Dark	14 days	≤4C, dark 14 days	1 L	Amber Glass with Teflon Lined Cap
524.2	Ascorbic Acid HCl pH<2, Cool 4C	14 days		40-120 mL	Glass with Teflon Lined Septum

SDWA (Circle or Explain)

Preservation and Holding Times for Regulated Parameters

rameter/ Method	Preservative	Sample Holding Time	Extract Holding Time	Suggested Sample Size	Type of Container
tals cept Hg)	HNO_3 pH < 2	6 months		1 L	Plastic or Glass
ercury	HNO_3 pH < 2	28 days		100 mL	Plastic or Glass
lkalinity	Cool, 4C	14 days		100 mL	Plastic or Glass
sbestos	Cool, 4C	48 hours			Plastic or Glass
hloride	none	28 days		50 mL	Plastic or Glass
esidual isinfectant	none	immediately		200 mL	Plastic or Glass
olor	Cool, 4C	48 hours		50 mL	Plastic or Glass
onductivity	Cool, 4C	28 days		100 mL	Plastic or Glass
yanide	Cool, 4C, Ascorbic acid (if chlorinated), NaOH pH > 12	14 days		1 L	Plastic or Glass
Fluoride	none	28 days		300 mL	Plastic or Glass
Foaming Agents	Cool, 4C	48 hours			
Nitrate (chlorinated)	Cool, 4C	28 days		100 mL	Plastic or Glass
Nitrate (non chlorinated)	Cool, 4C, H_2SO_4, pH < 2	14 days		100 mL	Plastic or Glass
Nitrite	Cool, 4C	48 hours		50 mL	Plastic or Glass
Odor	Cool, 4C	24 hours		200 mL	Glass
pH	none	immediately		25 mL	Plastic or Glass
o-Phosphate	Filter immediately, Cool, 4C	48 hours		50 mL	Plastic or Glass
Silica	Cool, 4C	28 days		100 mL	Plastic
Solids (TDS)	Cool, 4C	7 days		100 mL	Plastic or Glass
Sulfate	Cool, 4C	28 days		50 mL	Plastic or Glass

II. (QA and QC)

	SDWA Y/N	NPDES Y/N
K. Does your laboratory have a chain-of-custody program?	Y	
L. Are records maintained of preservation checks (verification of preservation by lab personnel)?		

Who provides the preservatives?

NPDES: _____

SDWA: _____

	SDWA Y/N	NPDES Y/N
M. Is there a sample custodian?	N*	

Name (SDWA): _____

Name (NPDES): _____

* None for Micro

N. Who is responsible for Sampling?

(SDWA): Organization: Water Plant Operators, Dist Engineers

Official: County Sanitarians

Phone No.: _____

(NPDES): Organization: _____

Official: _____

Phone No.: _____

	SDWA Y/N	NPDES Y/N
O. Is there a written policy for field equipment calibration and maintenance?		
P. Are records maintained of field equipment calibration and maintenance?		
Q. Does the laboratory have a written sample rejection policy?		
R. Do samples arrive on ice?	N*	

* For Micro

III. (QA and QC)

G. Are records maintained of problems and corrective actions?

	SDWA Y/N	NPDES Y/N
Out of control duplicate results		
Out of control spike results		
Out of control check standards		
Out of control in-house audits		

H. Are instrument calibration data recorded?

Does standard calibration include ≥3 standards and a reagent blank?

Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?

Do standard concentrations bracket sample concentrations?

	SDWA Y/N	NPDES Y/N
Are instrument calibration data recorded?		
Does standard calibration include ≥3 standards and a reagent blank?		
Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?		
Do standard concentrations bracket sample concentrations?		

List analyses for which "No" applies:

SDWA:

NPDES:

I. Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?

Is the laboratory pure water quality monitored routinely?

	SDWA Y/N	NPDES Y/N
Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?	✓	
Is the laboratory pure water quality monitored routinely?	✓	

Who is responsible?

SDWA (Name): Everyone in the Env. Micro Section

NPDES (Name): _____

J. Are all analytical records necessary to reconstruct the analyses maintained for 3 years?

Are calculations checked by a second analyst/ supervisor?

	SDWA Y/N	NPDES Y/N
Are all analytical records necessary to reconstruct the analyses maintained for 3 years?	✓	
Are calculations checked by a second analyst/ supervisor?	✓	

III. (QA and QC)

	SDWA Y/N	NPDES Y/N
A. Is there a written Quality Control Program plan?	Y	
B. Is there a Quality Assurance Manual?	Y	
C. Is there a Quality Control Officer?	N	

Name (SDWA): _____

Name (NPDES): _____

D. Frequency of:	SDWA	NPDES
Duplicate Analyses?		
Spike Analyses?		
Check Standards:		
In-House Audits?		

E. Records and Control Limits Maintained:

	SDWA Records Y/N	SDWA Limits Y/N	NPDES Records Y/N	NPDES Limits Y/N
Duplicate Analyses?				
Spike Analyses?				
Check Standards?				

List analyses for which "No" applies

SDWA:

NPDES:

F. How are the QC analyses used?

Duplicate analyses (SDWA): _____

Duplicate Analyses (NPDES): _____

Spike Analyses (SDWA): _____

Spike Analyses (NPDES): _____

Check Standards: _____

G. Are records maintained of problems and corrective actions?

	SDWA Y/N	NPDES Y/N
Out of control duplicate results		
Out of control spike results		
Out of control check standards		
Out of control in-house audits		

H. Are instrument calibration data recorded?

Does standard calibration include ≥3 standards and a reagent blank?

Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?

Do standard concentrations bracket sample concentrations?

	SDWA Y/N	NPDES Y/N
Instrument calibration data recorded?		
Standard calibration ≥3 standards + reagent blank?		
One calibration standard at or below MCL/permit limit?		
Standard concentrations bracket sample concentrations?		

List analyses for which "No" applies:

SDWA:

NPDES:

I. Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?

Is the laboratory pure water quality monitored routinely?

	SDWA Y/N	NPDES Y/N
Routine service checks performed on analytical instruments?	✓	
Laboratory pure water quality monitored routinely?	✓	

Who is responsible?

SDWA (Name): Everyone in the Env. Micro Section

NPDES (Name): _____

J. Are all analytical records necessary to reconstruct the analyses maintained for 3 years?

Are calculations checked by a second analyst/ supervisor?

	SDWA Y/N	NPDES Y/N
All analytical records necessary to reconstruct analyses maintained for 3 years?	✓	
Calculations checked by a second analyst/ supervisor?	✓	

III. (QA and QC)

G. Are records maintained of problems and corrective actions?

	SDWA Y/N	NPDES Y/N
Out of control duplicate results		
Out of control spike results		
Out of control check standards		
Out of control in-house audits		

H. Are instrument calibration data recorded?

Does standard calibration include ≥3 standards and a reagent blank?

Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?

Do standard concentrations bracket sample concentrations?

	SDWA Y/N	NPDES Y/N
Are instrument calibration data recorded?		
Does standard calibration include ≥3 standards and a reagent blank?		
Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?		
Do standard concentrations bracket sample concentrations?		

List analyses for which "No" applies:

SDWA:

NPDES:

I. Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?

Is the laboratory pure water quality monitored routinely?

	SDWA Y/N	NPDES Y/N
Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?	✓	
Is the laboratory pure water quality monitored routinely?	✓	

Who is responsible?

SDWA (Name): Everyone in the Env. Micro Section

NPDES (Name): _____

J. Are all analytical records necessary to reconstruct the analyses maintained for 3 years?

Are calculations checked by a second analyst/ supervisor?

	SDWA Y/N	NPDES Y/N
Are all analytical records necessary to reconstruct the analyses maintained for 3 years?	✓	
Are calculations checked by a second analyst/ supervisor?	✓	

E. Personnel

WV. Bur. for Public Health
Office of Lab. Services
Lab Name Environmental Chem. Lab.

Please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility.

Date ~~August 28, 1996~~ SEPT. 13, 1999 No. 1 of 1 pages

Name	Training: Degree (Circle One)	Training: Major	Position	Years of Experience: Present Job	Years of Experience: Previous Job	Identify Current Analyses Performed in Support of: SDWA	Identify Current Analyses Performed in Support of: NPDES
Wayne Morganroth	(Ph.D.) MS BS/BA Assoc. HS	Phys. Chem.	Lab. Sup.	2 yrs 10 mos.	4 Years		
~~Lin He~~	~~Ph.D.~~ MS BS/BA Assoc. HS	~~Chemistry~~	~~Chemist I~~	~~5 mos.~~	~~5 years~~	Nitrate/Nitrite, pH, Cond., Ca, TDS, Sulfate	
Larry A. Duffield	Ph.D. MS (BS/BA) Assoc. HS	Biology	Chemist II	12 years	5 years	Metals analyses - Flame and GFAA AA analytical work	
~~Brenda Barnett~~	Ph.D. MS ~~BS/BA~~ Assoc. HS	~~Biology~~	~~Chemist II~~	~~7 years~~	~~10 years~~	~~Organic analyses - pests herbs, VOC's THM's.~~	
GREG W. YOUNG	Ph.D. MS (BS/BA) Assoc. HS	CHEMISTRY	CHEMIST I	7 MOS.	2 YRS, 7 MOS.	NITRATE, NITRITE, pH, COND., CA, TDS, ALK., HARDNESS, SULFATE, ETC	
FRANK W. LAMBERT, JR.	(Ph.D.) MS BS/BA Assoc. HS	PUB. HEALTH	LAB DIRECTOR				

Post-it™ brand

Fax Transmittal Memo 7672

To Ellie Marshall	No. of Pages 5	Today's Date 9-15-99	Time
Company O. L. S.	From Wayne MOrganroth		
Location South Charleston, WV	Company Environmental Chemistry		
Fax #	Telephone #	Location BIG Charleston, WV	Dept. Charge
		Fax #	Telephone #
Comments		Original Disposition: ☐ Destroy ☐ Return ☐ Call for pickup	

	# of Samples	% Lab Work Load
SDWA	12,000	30 %
NPDES	———	———
RCRA	———	———
Superfund	———	———
Other Monitoring*	8,000	20 %
Milk Program (FDA)	6,000	50 %

* Public Water - Regulatory Checks
Private Wells
Home Loans
Recreational Waters (Pools, Hot Tubs, Beaches)
Bottled Waters
Dairy Farms & Plants
Source Waters
Disasters
Sewage Suspects (Ditches, etc.)

Tom's

State Laboratory Pre-Survey Package:

I. General Information

II. Personnel

III. Analytical A/QC

IV. A. SDWA- (Sample Containers, Preservation and Maximum Holding Times)

IV. B. SDWA- (Chemical Methodologies)

V. SDWA- (Microbiology Checklists): Please Complete and Return with Pre-Survey Package)

VI. A. NPDES (Sample Containers, Preservation and Maximum Holding Times)

VI. B. NPDES (Chemical Methodologies)

VII. NPDES (Microbiology Checklist): Please Complete and Return With Pre-Survey Package

VIII. Ambient Monitoring (Rivers, Bays, etc.) -Done under Grants to EPA (Sample Containers, Preservation and Maximum Holding Times)
ONLY COMPLETE SHOWING ANY DIFFERENCES FROM NPDES

IX. Ambient Monitoring (Rivers, Bays, etc.) -Done Under Grants to EPA (Chemical Methodologies)
ONLY COMPLETE SHOWING ANY DIFFERENCES FROM NPDES

X. Ambient Monitoring (Rivers, Bays, etc.) -Done Under Grants to EPA
ONLY COMPLETE SHOWING ANY DIFFERENCES FROM NPDES

State Laboratory Pre-Survey Package:

I. General Information

II. Personnel

III. Analytical QA/QC

IV.A SDWA- (Sample Containers, Preservation and Maximum Holding Times)

IV.B SDWA- (Chemical Methodologies)

V. SDWA (Microbiology Checklist): Please Complete and Return With Pre-Survey Package

3.7 Refrigerator

Maintain temperature at 1°C to 5°C _____
Thermometer graduated in 1° increments _____
Immerse thermometer bulb in liquid _____
QC Record temperature for days in use _____

3.8 Inoculating Equipment

Metal or plastic loops, or dry heat sterilized applicator sticks _____

3.9 Membrane Filtration Equipment

Manufacturer _____ Type _____

Stainless steel, glass or autoclavable plastic _____
Units non-leaking, unscratched, not corroded _____
10 to 15X magnification device with fluorescent light source _____
Forceps, tips without corrugations _____

3.10 Membrane Filters and Pads

Manufacturer _____ Type _____

Made from cellulose ester material, white, gridmarked, 47 mm diameter, 0.45 um pore size _____
Alternate pore size used _____
Membranes recommended by manufacturer for total coliform water analysis _____
Membranes and pads are presterilized or autoclaved _____

3.11 Culture Dishes

Presterilized plastic or sterilized glass dishes used _____
Loose-lid dishes incubated in a tight-fitting container _____
Glass culture dishes are sterilized in stainless steel or aluminum canisters or in heavy aluminum foil or char-resistant paper _____
Open packs of disposable culture dishes are resealed between uses _____

3.12 Pipets

Glass pipets sterilized in stainless steel or aluminum canisters or individual pipets wrapped in char-resistant paper _____
Reseal packs of disposable sterile pipets between major use periods _____
Pipets not etched, mouthpiece and tip are not chipped, graduation markings legible _____

3.13 Culture Tubes and Closures

Tubes are borosilicate glass or other corrosion-resistant glass _____
Culture tubes are of sufficient size that medium plus sample does not exceed 3/4 full _____
Closures are stainless steel, plastic, aluminum, or loosened screw caps with non-toxic liner _____

3.14 Sample Containers

Capacity at least 120 mL (4 oz.) _____
Wide-mouth plastic or glass bottle with screw cap or non-corrosive glass bottle with ground glass stopper _____
Non-toxic liner in screw caps _____
Glass-stoppered bottle top covered with aluminum foil or char-resistant paper before sterilization _____

3.15 Glassware and Plasticware

Glass made of borosilicate or other corrosive-resistant glass. _____
Free of chips and cracks _____
Graduation marks are legible _____
Plastic items are clear and non-toxic _____
Graduated cylinders used to measure sample volume have a 2.5% tolerance or better _____
Pipets used to measure sample volumes have a 2.5% tolerance or better _____

3.3 Temperature Monitoring Device

Glass/mercury or dial thermometer used in incubator units _____
Appropriate graduation increments for proper applications _____
No separation in mercury column _____
Check calibration of glass/mercury thermometer annually and dial thermometer quarterly against NBS therm. or one meeting NBS monograph 150 requirements. _____

3.4 Incubator

Manufacturer _____ Model _____

Maintains internal temperature of 35 +/- 0.5 degrees C _____
Thermometers placed on top and bottom shelves in use area of non-portable incubators _____
Immerse thermometer bulb in liquid _____
Culture dishes and tubes fit snugly in aluminum block incubator _____
Record temperature morning and afternoon in days in use _____

3.5 Waterbath

Manufacturer _____ Model _____

Maintains internal temperature at 44.5 +/- 0.2 degrees C _____
Thermometer placed in use areas _____
Bulb properly immersed _____
Culture dishes held beneath water surface _____
Record temperature morning and afternoon for days in use _____

3.6 Autoclave

Manufacturer _____ Model _____

Temperature gauge with sensor on exhaust _____
Operational safety valve _____
Maintains sterilization temperature during cycle _____
Completes entire cycle within 45 minutes when a 12-15 minute sterilization period is used _____
Depressurizes sufficiently slowly to insure media do not boil over and bubbles do not form in fermentation tubes _____
Approval of pressure cookers and vertical autoclaves requires QC data demonstrating sterility and proper media reactions
Record date, sterilization time, and temperature for each cycle _____
Establish service contract or internal maintenance protocol _____

3.7 Conductivity Meter

Manufacturer _____ Model _____

Graduated in ohms or mhos; range of 2 ohms to 2 megohms or equivalent michromhos +/- 1%; sensitivity of 0.33% or better _____

1.9 Quality Assurance:

Provide copies of results of PES analyses over the past two years: (Include information from all such Federal, State, and commercial evaluations)

Provide results of participation in Split Sample Analyses in microbiology over the past two years:

Provide copies of the most recent internal technical systems audit for microbiology.

Provide a self-appraisal by the lead microbiologist of the NPDES microbiology program featuring the strengths, weaknesses, equipment needs, and any additional information which would make this evaluation more meaningful. Current microbiology staff consists of one supervisor and two technicians dedicated to this area, who are very well trained, skillful and conscientious. Supporting staff are adequately trained.

2.0 Laboratory Facilities

Provide a brief description of current laboratory facilities addressing both the preparation and analytical areas. Facility located at 89 King Highway, Dover, DE; is approximately 5 years old. Preparation and analytical areas combined except for autoclave; adequate space of current staff and workload.

3.0 Laboratory Equipment, Supplies, and Materials

3.1 pH Meter

Manufacturer Accumet (Fisher) Model 900

Accuracy, +/- 0.1 unit Yes
Scale graduation, 0.1 units Yes
Use pH buffer aliquot only once Yes
Standardize pH meter each use period w/pH 7.0 standard buffer Yes

3.2 Balance

Manufacturer Mettler Model P1000

Detects 100mg at a 150 g. load Yes
Calibrate balance performance using Class X wts. Occassionally not docume
Record Maintained
Service Contract or internal maintenance protocol
Record Maintained

1.4 Forms: Please submit a copy of each field and laboratory form used to record the handling of samples and associated QC operations

1.5 Microbiological Training:

Training Received in Microbiology: _____

Training Given in Microbiology Related Areas: _____

Microbiological Training Needs:

Lab: _____

Field: _____

1.6 Workload in NPDES for Microbiology: _____

1.7 Parameters Routinely Analyzed for NPDES Samples: _____

1.8 Average Numbers of NPDES Samples Analyzed Per Annum: _____

(Microbiology)

1.0 Personnel and Documentation

1.1

Position/Title	Name	Academic Training HS BA/BS MA/MS Ph.D.	Experience
Laboratory Director			
Quality Assurance Officer			
Laboratory Supervisor			
Laboratory Professional			
Laboratory Analysts			

Note: List all possible analysts for NPDES samples, including weekend coverage

Position/Title	Name	Academic Trining HS BA/BS MA/MS Ph.D	Experience
Sampling Director			
Sampling Supervisor			
Samplers			

1.2 Briefly describe the coordination activities between the laboratory and field operations.

1.3 Manuals: Please submit a current copy of each available manual mentioned below so that they may be reviewed prior to the on-site.

Laboratory QA/QC Manual
Microbiological SOP related to NPDES
Any other appropriate lab manuals
NPDES Sampling Manual appropriate to microbiology

X. Ambient Monitoring (Complete Only Showing Any Differences From NPDES) (Microbiology)

On-Site Evaluation of Laboratory Involved in Analysis

Microbiology

Laboratory _____

Street _____

City _____ State _____

Telephone Number _____

Survey By _____

Affiliation _____

Date _____

Codes for Marking On-Site Evaluation Forms:
S-Satisfactory
X-Unsatisfactory
U-Undetermined
N-Not Applicable

IX. Ambient Monitoring:

TABLE IE.—LIST OF RADIOLOGIC TEST PROCEDURES

Parameter and units	Method	Reference (method number or page)			
		EPA[1]	Standard methods 18th Ed.	ASTM	USGS[2]
1. Alpha-Total, pCi per liter	Proportional or scintillation counter	900	7110 B	D1943–90	pp. 75 and 78.[3]
2. Alpha-Counting error, pCi per liter	Proportional or scintillation counter	Appendix B	7110 B	D1943–90	P. 79.
3. Beta-Total, pCi per liter	Proportional counter	900.0	7110 B	D1890–90	pp. 75 and 78.[3]
4. Beta-Counting error, pCi	Proportional counter	Appendix B	7110 B	D1890–90	p. 79.
5. (a) Radium Total pCi per liter	Proportional counter	903.0	7500Ra B	D2460–90	
(b)Ra, pCi per liter	Scintillation counter	903.1	7500Ra C	D3454–91	p. 81.

Table IE notes:

[1] Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA–600/4–80–032 (1980), U.S. Environmental Protection Agency, August 1980.

[2] Fishman, M.J. and Brown, Eugene," Selected Methods of the U.S. Geological Survey of Analysis of Wastewaters," U.S. Geological Survey, Open-File Report 76–177 (1976).

[3] The method found on p. 75 measures only the dissolved portion while the method on p. 78 measures only the suspended portion. Therefore, the two results must be added to obtain the "total".

55. Perthane	GC			D3086–90	
56. Prometron	GC				Note 3, p. 83; Note 6, p. S68.
57. Prometryn	GC				Note 3, p. 83; Note 6, p. S68.
58. Propazine	GC				Note 3, p. 83; Note 6, p. S68.
59. Propham	TLC				Note 3, p. 104; Note 6, p. S64.
60. Propoxur	TLC				Note 3, p. 94; Note 6, p. S60.
61. Secbumeton	TLC				Note 3, p. 83; Note 6, p. S68.
62. Siduron	TLC				Note 3, p. 104; Note 6, p. S64.
63. Simazine	GC				Note 3, p. 83; Note 6, p. S68.
64. Strobane	GC		6630 B & C		Note 3, p. 7.
65. Swep	TLC				Note 3, p. 104; Note 6, p. S64.
66. 2,4,5–T	GC		6640 B		Note 3, p. 115; Note 4, p. 35.
67. 2,4,5–TP (Silvex)	GC		6640 B		Note 3, p. 115
68. Terbuthylazine	GC				Note 3, p. 83; Note 6, p. S68.
69. Toxaphene	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
70. Trifluralin	GC		6630 B		Note 3, p. 7.

Table ID notes:

[1] Pesticides are listed in this table by common name for the convenience of the reader. Additional pesticides may be found under Table 1C, where entries are listed by chemical name.

[2] The full text of Methods 608 and 625 are given at Appendix A. "Test Procedures for Analysis of Organic Pollutants," of this Part 136. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at Appendix B. "Definition and Procedure for the Determination of the Method Detection Limit", of this Part 136.

[3] "Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater," U.S. Environmental Protection Agency, September, 1978. This EPA publication includes thin-layer chromatography (TLC) methods.

[4] "Methods for Analysis of Organic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3 (1987).

[5] The method may be extended to include α-BHC, γ-BHC, endosulfan I, endosulfan II, and endrin. However, when they are known to exist, Method 608 is the preferred method.

[6] "Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency." Supplement to the Fifteenth Edition of Standard Methods for the Examination of Water and Wastewater (1981).

[7] Each analyst must make an initial, one-time, demonstration of their ability to generate acceptable precision and accuracy with Methods 608 and 625 (See Appendix A of this Part 136) in accordance with procedures given in section 8.2 of each of these methods. Additionally, each laboratory, on an-going basis, must spike and analyze 10% of all samples analyzed with Method 608 or 5% of all samples analyzed with Method 625 to monitor and evaluate laboratory data quality in accordance with Sections 8.3 and 8.4 of these methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect and cannot be reported to demonstrate regulatory compliance. These quality control requirements also apply to the Standard Methods, ASTM Methods, and other Methods cited.

NOTE: These warning limits are promulgated as an "interim final action with a request for comments."

[8] "Organochlorine Pesticides and PCBs in Wastewater Using Empore™ Disk", 3M Corporation, Revised 10/28/94.

IX. Ambient Monitoring:

TABLE ID.—LIST OF TEST PROCEDURES FOR PESTICIDES [1]—Continued

Parameter	Method	EPA [27]	Standard methods 18th Ed.	ASTM	Other
23. Diazinon	GC				Note 3, p. 25; Note 4, p. 30; Note 6, p. S51.
24. Dicamba	GC				Note 3, p. 115.
25. Dichlofenthion	GC				Note 4, p. 30; Note 6, p. S73.
26. Dichloran	GC		6630 B & C		Note 3, p. 7.
27. Dicofol	GC			D3086–90	
28. Dieldrin	GC	608	6630 B & C		Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
29. Dioxathion	GC				Note 4, p. 30; Note 6, p. S73.
30. Disulfoton	GC				Note 3, p. 25; Note 6, p. S51.
31. Diuron	TLC				Note 3, p. 104; Note 6, p. S64.
32. Endosulfan I	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 8.
	GC/MS	[5]625	6410 B		
33. Endosulfan II	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 8.
	GC/MS	[5]625	6410 B		
34. Endosulfan Sulfate	GC	608	6630 C		Note 8.
	GC/MS	625	6410 B		
35. Endrin	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	[5]625	6410 B		
36. Endrin aldehyde	GC	608			Note 8.
	GC/MS	625			
37. Ethion	GC				Note 4, p. 30; Note 6, p. S73.
38. Fenuron	TLC				Note 3, p. 104; Note 6, p. S64.
39. Fenuron–TCA	TLC				Note 3, p. 104; Note 6, p. S64.
40. Heptachlor	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
41. Heptachlor epoxide	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 6, p. S73; note 8.
	GC/MS	625	6410 B		
42. Isodrin	GC				Note 4, p. 30; Note 6, p. S73.
43. Linuron	GC				Note 3, p. 104; Note 6, p. S64.
44. Malathion	GC		6630 C		Note 3, p. 25; Note 4, p. 30; Note 6, p. S51.
45. Methiocarb	TLC				Note 3, p. 94; Note 6, p. S60.
46. Methoxychlor	GC		6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
47. Mexacarbate	TLC				Note 3, p. 94; Note 6, p. S60.
48. Mirex	GC		6630 B & C		Note 3, p. 7.
49. Monuron	TLC				Note 3, p. 104; Note 6, p. S64.
50. Monuron	TLC				Note 3, p. 104; Note 6, p. S64.
51. Nuburon	TLC				Note 3, p. 104; Note 6, p. S64.
52. Parathion methyl	GC		6630 C		Note 3, p. 25; Note 4, p. 30.
53. Parathion ethyl	GC		6630 C		Note 3, p. 25.
54. PCNB	GC		6630 B & C		Note 3, p. 7.

[5]Method 625 may be extended to include benzidine, hexachlorocyclopentadiene, N-nitrosodimethylamine, and N-nitrosodiphenylamine. However, when they are known to be present, Methods 605, 607, and 612, or Method 1625, are preferred methods for these compounds.

[5a]625, Screening only.

[6]"Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency", Supplement to the Fifteenth Edition of Standard Methods for the Examination of Water and Wastewater (1981).

[7]Each Analyst must make an initial, one-time demonstration of their ability to generate acceptable precision and accuracy with Methods 601–603, 624, 625, 1624, and 1625 (See Appendix A of this Part 136) in accordance with procedures each in section 8.2 of each of these Methods. Additionally, each laboratory, on an on-going basis must spike and analyze 10% (5% for Methods 624 and 625 and 100% for methods 1624 and 1625) of all samples to monitor and evaluate laboratory data quality in accordance with sections 8.3 and 8.4 of these Methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect and cannot be reported to demonstrate regulatory compliance.

NOTE: These warning limits are promulgated as an "interim final action with a request for comments."

[8]"Organochlorine Pesticides and PCBs in Wastewater Using Empore TM Disk", 3M Corporation Revised 10/28/94.

TABLE ID.—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES[1]

Parameter	Method	EPA[27]	Standard methods 18th Ed.	ASTM	Other
1. Aldrin	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
2. Ametryn	GC				Note 3, p. 83; Note 6, p. S68.
3. Aminocarb	TLC				Note 3, p. 94; Note 6, p. S16.
4. Atraton	GC				Note 3, p. 83; Note 6, p. S68.
5. Atrazine	GC				Note 3, p. 83; Note 6, p. S68.
6. Azinphos methyl	GC				Note 3, p. 25; Note 6, p. S51.
7. Barban	TLC				Note 3, p. 104; Note 6, p. S64.
8. α-BHC	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 8.
	GC/MS	[5]625	6410 B		
9. β-BHC	GC	608	6630 C	D3086–90	Note 8.
	GC/MS	[5]625	6410 B		
10. δ-BHC	GC	608	6630 C	D3086–90	Note 8.
	GC/MS	[5]625	6410 B		
11. δ-BHC (Lindane)	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
12. Captan	GC		6630 B	D3086–90	Note 3, p. 7.
13. Carbaryl	TLC				Note 3, p. 94; Note 6, p. S60.
14. Carbophenothion	GC				Note 4, p. 30; Note 6, p. S73.
15. Chlordane	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 8.
	GC/MS	625	6410 B		
16. Chloropropham	TLC				Note 3, p. 104; Note 6, p. S64.
17. 2,4–D	GC		6640 B		Note 3, p. 115; Note 4, p. 35.
18. 4,4'–DDD	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
19. 4,4'–DDE	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
20. 4,4'–DDT	GC	608	6630 B & C	D3086–90	Note 3, p. 7; note 4, p. 30; note 8.
	GC/MS	625	6410 B		
21. Demeton–O	GC				Note 3, p. 25; Note 6, p. S51.
22. Demeton-S	GC				Note 3, p. 25; Note 6, p. S51.

TABLE IC.—LIST OF TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS—Continued

Parameter[1]	EPA method number[2,7]					
	GC	GC/MS	HPLC	Standard method 18th Ed.	ASTM	Other
69. Nitrobenezene	609	625, 1625	.....	6410 B		
70. 2-Nitrophenol	604	625, 1625	.....	6410 B, 6420 B		
71. 4-Nitrophenol	604	625, 1625	.....	6410 B, 6420 B		
72. N-Nitrosodimethylamine	607	625, 1625	.....	6410 B		
73. N-Nitrosodi-n-propylamine	607	[5]625, 1625	.....	6410 B		
74. N-Nitrosodiphenylamine	607	[5]625, 1625	.....	6410 B		
75. 2,2-Oxybis(1-chloropropane)	611	625, 1625	.....	6410 B		
76. PCB–1016	608	625	.....	6410 B		Note 3, p. 43; note 8.
77. PCB–1221	608	625	.....	6410 B		Note 3, p. 43; note 8.
78. PCB–1232	608	625	.....	6410 B		Note 3, p. 43; note 8.
79. PCB–1242	608	625	.....	6410 B		Note 3, p. 43; note 8.
80. PCB–1248	608	625	.....			Note 3, p. 43; note 8.
81. PCB–1254	608	625	.....	6410 B		Note 3, p. 43; note 8.
82. PCB–1260	608	625	.....	6410 B, 6630 B		Note 3, p. 43; note 8.
83. Pentachlorophenol	604	625, 1625	.....	6410 B, 6630 B		Note 3, p.140.
84. Phenanthrene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
85. Phenol	604	625, 1625	.....	6420 B, 6410 B		
86. Pyrene	610	625, 1625	610	6410 B, 6440 B	D4675–92	
87. 2,3,7,8-Tetrachlorodibenzo-p-dioxin	.....	[3]613	.....			
88. 1,1,2,2-Tetrachloroethane	601	624, 1624	.....	6230 B, 6210 B		Note 3, p.130.
89. Tetrachloroethene	601	624, 1624	.....	6230 B, 6210 B		Note 3, p.130.
90. Toluene	602	624, 1624	.....	6210 B, 6220 B		
91. 1,2,4-Trichlorobenzene	612	625, 1625	.....	6410 B		Note 3, p.130.
92. 1,1,1-Trichloroethane	601	624, 1624	.....	6210 B, 6230 B		
93. 1,1,2-Trichloroethane	601	624, 1624	.....	6210 B, 6230 B		Note 3, p.130.
94. Trichloroethene	601	624, 1624	.....	6210 B, 6230 B		
95. Trichlorofluoromethane	601	624	.....	6210 B, 6230 B		
96. 2,4,6-Trichlorophenol	604	625, 1625	.....	6410 B, 6240 B		
97. Vinyl chloride	601	624, 1624	.....	6210 B, 6230 B		

Table 1C notes:

[1] All parameters are expressed in micrograms per liter (µg/L).

[2] The full text of Methods 601–613, 624, 625, 1624, and 1625, are given at appendix A, "Test Procedures for Analysis of Organic Pollutants," of this part 136. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at appendix B, "Definition and Procedure for the Determination of the Method Detection Limit" of this part 136.

[3] "Methods for Benzidine: Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater," U.S. Environmental Protection Agency, September, 1978.

[4] Method 624 may be extended to screen samples for Acrolein and Acrylonitrile. However, when they are known to be present, the preferred method for these two compounds is Method 603 or Method 1624.

22. Carbon tetrachloride	601	624, 1624	———	6230 B, 6410 B		Note 3, p.130.
23. 4-Chloro-3-methylphenol	604	625, 1625	———	6410 B, 6420 B		Note 3, p.130.
24. Chlorobenzene	601, 602	624, 1624	———	6210 B, 6220 B 6230 B		
25. Chloroethane	601	624, 1624	———	6210 B, 6230 B		
26. 2-Chloroethylvinyl ether	601	624, 1624	———	6210 B, 6230 B		Note, p.130.
27. Chloroform	601	624, 1624	———	6210 B, 6230 B		
28. Chloromethane	601	624, 1624	———	6210 B, 6230 B		
29. 2-Chloronaphthalene	612	625, 1625	———	6410 B		
30. 2-Chlorophenol	604	625, 1625	———	6410 B, 6420 B		
31. 4-Chlorophenylphenyl ether	611	625, 1625	———	6410 B		
32. Chrysene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
33. Dibenzo(a,h)anthracene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
34. Dibromochloromethane	601	624, 1624	———	6210 B, 6230 B		
35. 1, 2-Dichlorobenzene	601,602,612	624,625,1625	———	6410 B, 6230 B, 6220 B		
36. 1, 3-Dichlorobenzene	601,602,612	624,625,1625	———	6410 B, 6230 B, 6220 B		
37. 1,4-Dichlorobenzene	601, 602, 612	624, 625, 1625	———	6410 B, 6220 B, 6230 B		
38. 3, 3-Dichlorobenzidine	———	625, 1625	605	6410 B		
39. Dichlorodifluoromethane	601	———	———	6230 B		
40. 1, 1-Dichloroethane	601	624, 1624	———	6230 B, 6210 B		
41. 1, 2-Dichloroethane	601	624, 1624	———	6230 B, 6210 B		
42. 1, 1-Dichloroethene	601	624, 1624	———	6230 B, 6210 B		
43. trans-1, 2-Dichloroethene	601	624, 1624	———	6230 B, 6210 B		
44. 2, 4-Dichlorophenol	604	625, 1625	———	6420 B, 6410 B		
45. 1, 2-Dichloropropane	601	624, 1624	———	6230 B, 6210 B		
46. cis-1, 3-Dichloropropene	601	624, 1624	———	6230 B, 6210 B		
47. trans-1, 3-Dichloropropene	601	624, 1624	———	6230 B, 6210 B		
48. Diethyl phthalate	606	625, 1625	———	6410 B		
49. 2, 4-Dimethylphenol	604	625, 1625	———	6420 B, 6410 B		
50. Dimethyl phthalate	606	625, 1625	———	6410 B		
51. Di-n-butyl phthalate	606	625, 1625	———	6410 B		
52. Di-n-octyl phthalate	606	625, 1625	———	6410 B		
53. 2, 3-Dinitrophenol	604	625, 1625	———	6420 B, 6410 B		
54. 2,4-Dinitrotoluene	609	625, 1625	———	6410 B		
55. 2, 6-Dinitrotoluene	609	625, 1625	———	6410 B		
56. Epichlorohydrin	———	———	———			Note 3, p.130 Note 6, p.S102.
57. Ethylbenzene	602	624, 1624	———	6220 B, 6210 B		
58. Fluoranthene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
59. Fluorene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
60. Hexachlorobenzene	612	625, 1625	———	6410 B		
61. Hexachlorobutadiene	612	625, 1625	———	6410 B		
62. Hexachlorocyclopentadiene	612	[5]625, 1625	———	6410 B		
63. Hexachloroethane	616	625, 1625	———	6410 B		
64. Ideno(1,2,3-cd) pyrene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
65. Isophorone	609	625, 1625	———	6410 B		
66. Methylene chloride	601	624, 1624	———	6230 B		Note 3, p.130.
67. 2-Methyl-4,6-dinitrophenol	604	625, 1625	———	6420 B, 6410 B		
68. Naphthalene	610	625, 1625	610	6410 B, 6440 B		

[27] The approved method is cited in Standard Methods for the Examination of Water and Wastewater, 14th Edition. The colorimetric reaction is conducted at a pH of 10.0±0.2. The approved methods are given on pp 576–81 of the 14th Edition: Method 510A for distillation, Method 510B for the manual colorimetric procedure, or Method 510C for the manual spectophotometric procedure.

[28] R. F. Addison and R.G. Ackman, "Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography," Journal of Chromatography, vol. 47, No. 3, pp. 421–426, 1970.

[29] Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/L and above are inadequate where silver exists as an inorganic halide. Silver halides such as the bromide and chloride are relatively insoluble in reagents such as nitric acid but are readily soluble in an aqueous buffer of sodium thiosulfate and sodium hydroxide to pH of 12. Therefore, for levels of silver above 1 mg/L, 20 mL of sample should be diluted to 100 mL by adding 40 mL each of 2 M $Na_2S_2O_3$ and NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/L the approved method is satisfactory.

[30] The approved method is that cited in Standard Methods for the Examination of Water and Wastewater, 15th Edition.

[31] EPA Methods 335.2 and 335.3 require the NaOH absorber solution final concentration to be adjusted to 0.25 N before colorimetric determination of total cyanide.

[32] Stevens, H.H., Ficke, J.F., and Smoot, G.F., "Water Temperature—Influential Factors, Field Measurement and Data Presentation", Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 1, Chapter D1, 1975.

[33] Zinc, Zincon Method, Method 8009, Hach Handbook of Water Analysis, 1979, pages 2–231 and 2–333, Hach Chemical Company, Loveland, CO 80537.

[34] "Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes, Method AES0029," 1986—Revised 1991, Fison Instruments, Inc., 32 Commerce Center, Cherry Hill Drive, Danvers, MA 01923.

[35] Precision and recovery statements for the atomic absorption direct aspiration and graphite furnace methods, and for the spectrophotometric SDDC method for arsenic are provided in Appendix D of this part titled, "Precision and Recovery Statements for Methods for Measuring Metals".

[36] "Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals", CEM Corporation, P.O. Box 200, Matthews, NC 28106–0200, April 16, 1992. Available from the CEM Corporation.

[37] When determining boron and silica, only plastic, PTFE, or quartz laboratory ware may be used from start until completion of analysis.

[38] Only the trichlorofluoromethane extraction solvent is approved.

[39] Nitrogen, Total Kjeldahl, Method PAI–DK01 (Block Digestion, Steam Distillation, Titrimetric Detection), revised 12/22/94, Perstop Analytical Corporation.

[40] Nitrogen, Total Kjeldahl, Method PAI–DK02 (Block Digestion, Steam Distillation, Colorimetric Detection), revised 12/22/94, Perstop Analytical Corporation.

[41] Nitrogen, Total Kjeldahl, Method PAI–DK03 (Block Digestion, Automated FIA Gas Diffusion), revised 12/22/94, Perstop Analytical Corporation.

TABLE IC.—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS

Parameter[1]	EPA method number[27]					
	GC	GC/MS	HPLC	Standard method 18th Ed.	ASTM	Other
1. Acenaphthene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
2. Acenaphthylene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
3. Acrolein	603	[4]604, 1624	.....			
4. Acrylonitrile	603	[4]624, 1624	610			
5. Anthracene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
6. Benzene	602	624, 1624	.....	6210 B, 6220 B		
7. Benzidine	.....	[5]625, 1625	605			Note 3, p.1.
8. Benzo(a)anthracene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
9. Benzo(a)pyrene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
10. Benzo(b)fluoranthene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
11. Benzo(g, h, i)perylene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
12. Benzo(k)fluoranthene	610	625, 1625	610	6410 B, 6440 B	D4657–92	
13. Benzyl chloride	.....	.....	.....			Note 3, p.130: Note 6, p. S102.
14. Benzyl butyl phthalate	606	625, 1625	.....	6410 B		
15. Bis(2-chloroethoxy) methane	611	625, 1625	.....	6410 B		
16. Bis(2-chloroethyl) ether	611	625, 1625	.....	6410 B		
17. Bis (2-ethylhexyl) phthalate	606	625, 1625	.....	6410 B, 6230 B		
18. Bromodichloromethane	601	624, 1624	.....	6210 B, 6230 B		
19. Bromoform	601	624, 1624	.....	6210 B, 6230 B		
20. Bromomethane	601	624, 1624	.....	6210 B, 6230 B		
21. 4-Bromophenylphenyl ether	611	625, 1625	.....	6410 B		

State Laboratory SDWA and NPDES Pre-Survey Package

Date: 7/7/99

I. General Information

A. Name of Laboratory: WV Department of Health & Human Resources
Bureau for Public Health
Office of Laboratory Services

B. Address: 167 11th Avenue
South Charleston, WV 25303

C. Telephone Number: (304) 558-3530

D. Name of Laboratory Director: Frank W. Lambert, Jr., Dr. P.H.

E. Provide an organizational chart of the laboratory, including any field operations or other internal affiliations to show how the laboratory fits into the general organizational structure.
Indicate SDWA and NPDES related portions of the laboratory organization.

F. List names of principal users of services of the laboratory.

Public Water Supplies	Private Individuals
County Health Departments	Bottled Water Companies
State Sanitarians & Engineers	
Private Contractors	

G. List laboratory support provided by commercial laboratories, and other State or Federal laboratories.

State Laboratory Pre-Survey Package:

I. General Information

II. Personnel

III. Analytical QA/QC

IV.A SDWA- (Sample Containers, Preservation and Maximum Holding Times)

IV.B SDWA- (Chemical Methodologies)

V. SDWA (Microbiology Checklist): Please Complete and Return With Pre-Survey Package

I. General Information

State Laboratory SDWA and NPDES Pre-Survey Package

Date: September 13, 1999

I. General Information

A. Name of Laboratory: WV Bureau for Public Health, Office of Lab Services
Environmental Chemistry Laboratory Section

B. Address: 4710 Chimney Drive, Suite G
Charleston, West Virginia 25302

C. Telephone Number: 1-304-558-0197

D. Name of Laboratory Director: Dr. Frank W. Lambert, Jr., (Dir O.L.S.)

E. Provide an organizational chart of the laboratory, including any field operations or other internal affiliations to show how the laboratory fits into the general organizational structure. Indicate SDWA and NPDES related portions of the laboratory organization.

F. List names of principal users of services of the laboratory.

WV Office of Environmental Health Services Engineering Division Field Engineers, County Health Department Sanitarians, Public Water Systems and private citizens.

G. List laboratory support provided by commercial laboratories, and other State or Federal laboratories.

Perform analyses for Public Water Systems, some analyses for Field Engineers that our laboratory cannot perform and private citizens. Any analyses for organic parameters are provided by commercial laboratories.

STATE LABORATORY PRE-SURVEY PACKAGE

I. GENERAL INFORMATION

II. PERSONNEL

III. ANALYTICAL QA/QC

IV.

A. SDWA (Sample Containers, Preservation and Maximum Holding Times).

B. SDWA (Chemical Methodologies)

V. SDWA (Microbiology Checklist): Please complete and return with pre-survey package.

H. Indicate the approximate number of samples analyzed:

	Approximate number of Samples/Year	Approximate % of Laboratory Workload/Yr
SDWA:	588 (Average of the last 2 fiscal years).	
NPDES:		
RCRA:		
Superfund:		
Other Monitoring:		

Personnel

WV Bur for Public Health
~~Office of~~ Lab Services
Lab Name Environmental Chem. Laboratory

Please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility.

Date September 13, 1999 No. 1 of 1 pages

Name	Training		Position	Years of Experience		Identify Current Analyses Performed In Support of:	
	Degree (Circle One)	Major		Present Job	Previous Job	SDWA	NPDES
Frank W. Lambert, Jr.	Ph.D. MS BS/BA Assoc. HS						
Wayne Morganroth	Ph.D. MS BS/BA Assoc. HS	Chemistry	Lab. Sup.	5 yrs 11 mos.	4 Years		
Larry A. Duffield	Ph.D. MS BS/BA Assoc. HS	Biology	Chemist II	15 years	5 years	Metals analyses Flame & GFAA AA and ICP AES analytical work	
Greg W. Young	Ph.D. MS BS/BA Assoc. HS	Chemistry	Chemist I	7 Months	2 Yrs 7 mos.	Nitrate, Nitrite pH, Cond., Chloride, Alk., TDS, Hardness Sulfate, Fluoride Turb.	
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc.						

Personnel

WV Bureau for Public Health
Lab Name Office of Lab Services - Microbiology

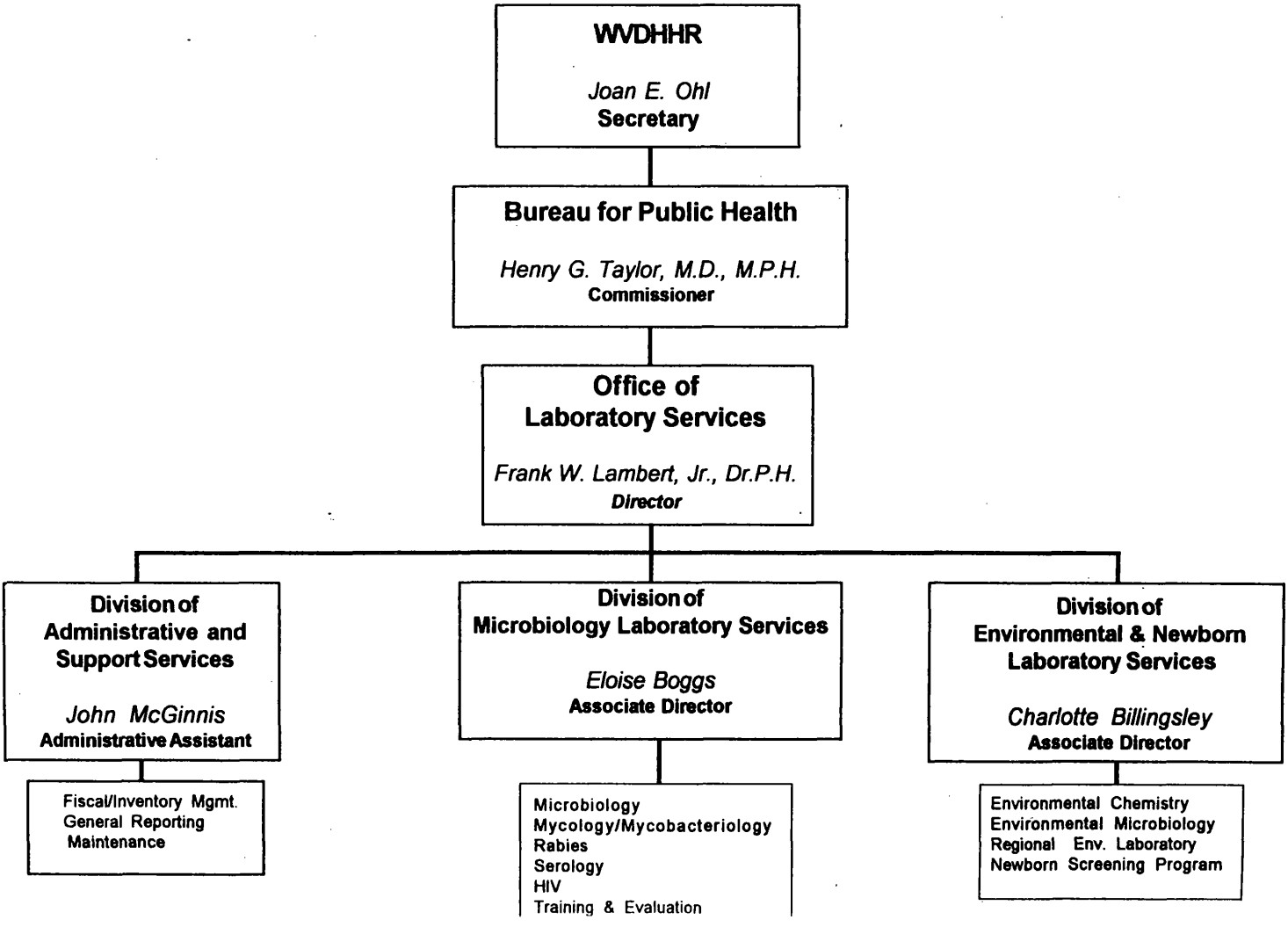
Please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility.

Date 7/7/99 No. ____ of ____ pages

Name	Training		Position	Years of Experience		Identify Current Analyses Performed in Support of:	
	Degree (Circle One)	Major		Present Job	Previous Job	SDWA	NPDES
Micah Moore	Ph.D. MS BS/BA Assoc. HS	Chemistry	Laboratory	2 mo.		Total Coliform Fecal Coliform E coli HPC	
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						

8/97

West Virginia Department of Health & Human Resources
Bureau for Public Health
Office of Laboratory Services



III. (QA and QC)

	SDWA Y/N	NPDES Y/N
A. Is there a written Quality Control Program plan?	Y* / N	
B. Is there a Quality Assurance Manual?	Y	
C. Is there a Quality Control Officer?	Y	

* No individual plan - included as a part of analytical procedures.

Name (SDWA): Wayne Morganroth

Name (NPDES): _____

D. Frequency of:	SDWA	NPDES
Duplicate Analyses? For primary metals & inorganics	10%	
Spike Analyses? All metals samples and one per * analytical run for inorganics (primary analytes)	Y	
Check Standards: 10% of metals and primary inorganic analytes.	Y	
In-House Audits?	N	

E. Records and Control Limits Maintained:

	SDWA Records Y/N	SDWA Limits Y/N	NPDES Records Y/N	NPDES Limits Y/N
Duplicate Analyses?	Y	Y		
Spike Analyses?	Y	Y		
Check Standards?	Y	Y		

For primary and secondary metals - is being implemented for primary inorganics.

List analyses for which "No" applies

SDWA:

NPDES:

F. How are the QC analyses used?

Duplicate analyses (SDWA): to determine the degree of analytical precision

Duplicate Analyses (NPDES): _____

Spike Analyses (SDWA): to assess the degree of analyte recovery

Spike Analyses (NPDES): _____

Check Standards: determine calibration stability and analytical validity.

III. (QA and QC)

G. Are records maintained of problems and corrective actions?

	SDWA Y/N	NPDES Y/N
Out of control duplicate results		
Out of control spike results		
Out of control check standards		
Out of control in-house audits		

H. Are instrument calibration data recorded?

Does standard calibration include ≥3 standards and a reagent blank?

Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?

Do standard concentrations bracket sample concentrations?

	SDWA Y/N	NPDES Y/N
Are instrument calibration data recorded?		
Does standard calibration include ≥3 standards and a reagent blank?		
Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?		
Do standard concentrations bracket sample concentrations?		

List analyses for which "No" applies:

SDWA:

NPDES:

I. Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?

Is the laboratory pure water quality monitored routinely?

	SDWA Y/N	NPDES Y/N
Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?	Y	
Is the laboratory pure water quality monitored routinely?	Y	

Who is responsible?

SDWA (Name): Everyone in the Env. Micro Section

NPDES (Name): _____

J. Are all analytical records necessary to reconstruct the analyses maintained for 3 years?

Are calculations checked by a second analyst/ supervisor?

	SDWA Y/N	NPDES Y/N
Are all analytical records necessary to reconstruct the analyses maintained for 3 years?	Y	
Are calculations checked by a second analyst/ supervisor?	Y	

III. (QA and QC)

	SDWA Y/N	NPDES Y/N
G. Are records maintained of problems and corrective actions?		
Out of control duplicate results	N*	
Out of control spike results	N*	
Out of control check standards	N*	
Out of control in-house audits	NA	

If data is out of control the procedure is examined for problems and repeated to obtain satisfactory results.

	SDWA Y/N	NPDES Y/N
H. Are instrument calibration data recorded?	Y	
Does standard calibration include ≥3 standards and a reagent blank?	Y	
Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?	Y	
Do standard concentrations bracket sample concentrations?	Y	

List analyses for which "No" applies:

SDWA: Analyses for Secondary and miscellaneous inorganic non-metal contaminants.

NPDES:

	SDWA Y/N	NPDES Y/N
I. Are routine service checks performed on analytical instruments, (balances/spectrophotometers etc.)?	Y	
Is the laboratory pure water quality monitored routinely?	Y	

Who is responsible?

SDWA (Name): Metals lab: Larry Duffield
Inorganic non-metals lab: Greg Young

NPDES (Name): _____

	SDWA Y/N	NPDES Y/N
J. Are all analytical records necessary to reconstruct the analyses maintained for 3 years?	Y	
Are calculations checked by a second analyst/ supervisor?	N*	

* Being implemented.

III. (QA and QC)

	SDWA Y/N	NPDES Y/N
K. Does your laboratory have a chain-of-custody program?	Y	
L. Are records maintained of preservation checks (verification of preservation by lab personnel)?	Y	

Who provides the preservatives?

NPDES: _____

SDWA: Our laboratory.

	SDWA Y/N	NPDES Y/N
M. Is there a sample custodian?	Y	

Name (SDWA): Wayne Morganroth

Name (NPDES): _____

N. Who is responsible for Sampling?

(SDWA): Organization: Our laboratory (mailed sampling instructions), WV State Health Dept., District Engineers, county sanitarians and customers.

Official: For our lab: Wayne Morganroth

Phone No.: 1-304-558-0197

(NPDES): Organization: _____

Official: _____

Phone No.: _____

	SDWA Y/N	NPDES Y/N
O. Is there a written policy for field equipment calibration and maintenance?	NA	
P. Are records maintained of field equipment calibration and maintenance?	NA	
Q. Does the laboratory have a written sample rejection policy?	Y	
R. Do samples arrive on ice?	Y*	

* For those samples we supply sampling supplies and instructions.

SDWA (Circle or Explain)

IV A. **Preservation and Holding Times for Regulated Parameters**

Parameter/ Method	Preservative	Sample Holding Time	Extract Holding Time	Suggested Sample Size	Type of Container
Metals (except Hg)	HNO_3 pH<2	6 months		1 L	Plastic or Glass
Mercury	HNO_3 pH<2	28 days		~~100 mL~~ 1 L	Plastic or Glass
Alkalinity	Cool, 4C *	14 days		~~100 mL~~ 1 L	Plastic or Glass
Asbestos	Cool, 4C	48 hours			Plastic or Glass
Chloride	none	28 days		~~50 mL~~ 1 L	Plastic or Glass
Residual Disinfectant	none	immediately		200 mL	Plastic or Glass
Color	Cool, 4C	48 hours		50 mL	Plastic or Glass
Conductivity	Cool, 4C *	28 days		~~100 mL~~ 1 L	Plastic or Glass
Cyanide	Cool, 4C, Ascorbic acid (if chlorinated), NaOH pH>12	14 days		1 L	Plastic or Glass
Fluoride	none	28 days		~~300 mL~~ 500 mL	Plastic or Glass
Foaming Agents	Cool, 4C	48 hours			
Nitrate (chlorinated)	Cool, 4C	28 days		100 mL	Plastic or Glass
Nitrate (non chlorinated)	Cool, 4C, H_2SO_4, pH<2	14 days		100 mL	Plastic or Glass
Nitrite	Cool, 4C	48 hours		~~50 mL~~ 100 mL	Plastic or Glass
Odor	Cool, 4C	24 hours		200 mL	Glass
pH	none	immediately +		~~25 mL~~ 1 L	Plastic or Glass
o-Phosphate	Filter immediately, Cool, 4C	48 hours		50 mL	Plastic or Glass
Silica	Cool, 4C	28 days		100 mL	Plastic
Solids (TDS)	Cool, 4C *	7 days @		~~100 mL~~ 1 L	Plastic or Glass
Sulfate	Cool, 4C *	28 days		~~50 mL~~ 1 L	Plastic or Glass

Parameter/ Method	Preservative	Sample Holding Time	Extract Holding Time	Suggested Sample Size	Type of Container
Temperature	none	immediately		1 L	Plastic or Glass
Turbidity	Cool, 4C *	48 hours **		~~100 mL~~ 1 L	Plastic or Glass
502.2	Sodium Thiosulfate or Ascorbic Acid, 4C, HCl pH<2	14 days		40-120 mL	Glass with Teflon Lined Septum
504.1	Sodium Thiosulfate Cool, 4C,	14 days	4C, 24 hours	40 mL	Glass with Teflon Lined Septum
505	Sodium Thiosulfate Cool, 4C	14 days (7 days for Heptachlor)	4C, 24 hours	40 mL	Glass with Teflon Lined Septum
506	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 14 days	1 L	Amber Glass with Teflon lined Cap
507	Sodium Thiosulfate Cool, 4C, Dark	14 days(see method for exceptions)	4C, dark 14 days	1 L	Amber Glass with Teflon Lined Cap
508	Sodium Thiosulfate Cool, 4C, Dark	7 days (see method for exceptions)	4C, dark 14 days	1 L	Glass with Teflon Lined Cap
508A	Cool, 4C	14 days	30 days	1 L	Glass with Teflon Lined Cap
508.1	Sodium Sulfite HCl pH<2 Cool, 4C	14 days (see method for exceptions)	30 days	1 L	Glass with Teflon Lined Cap
515.1	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 28 days	1 L	Amber Glass with Teflon Lined Cap
515.2	Sodium Thiosulfate HCl pH<2 Cool, 4C, Dark	14 days	≤4C, dark 14 days	1 L	Amber Glass with Teflon Lined Cap
524.2	Ascorbic Acid HCl pH<2, Cool 4C	14 days		40-120 mL	Glass with Teflon Lined Septum

NOTES TO ACCOMPANY SELECTIONS MADE IN PRESERVATION AND HOLDING TIMES FOR REGULATED PARAMETERS

*** Samples are received (via mail, UPS, etc.) in the laboratory at ambient temperature - they are then placed in a refrigerator at 4 degrees C.**

+ Since sample receipt in the laboratory is usually at least one to several days after the time of sampling, "immediate analysis" is precluded.

@ Due to the post-sampling "age" of most samples (see +, above), analyzing samples strictly within the maximum holding time period for these parameters is difficult or impossible.

**** Yes if the sample is not "too old" when received in the laboratory.**

IV B. Approved Methods for Primary Inorganic Chemicals, Parameters in the Lead and Copp Rule, Sodium, and Turbidity [§141.23(k)(1)]

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Ot
Antimony	ICP-MS	200.8[2]			
	Hydride-AA		D3697-92		
	AA-Platform	200.9[2]			
	AA-Furnace			3113B	
Arsenic	ICP	200.7[2]		3120B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
	AA-Furnace		D2972-93C	3113B	
	Hydride-AA		D2972-93B	3114B	
Asbestos	TEM	100.1[9]			
	TEM	100.2[10]			
Barium	ICP	200.7[2]		3120B	
	ICP-MS	200.8[2]			
	AA-Direct			3111D	
	AA-Furnace			3113B	
Beryllium	ICP	200.7[2]		3120B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
	AA-Furnace		D3645-93B	3113B	
Cadmium	ICP	200.7[2]			
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
	AA-Furnace			3113B	
Chromium	ICP	200.7[2]		3120B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
	AA-Furnace			3113B	

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other
Cyanide	Man. Distillation followed by:			4500-CN-C	
	Spec., Amenable		D2036-91B	4500-CN-G	
	Spec.Manual		D2036-91A	4500-CN-E	I-3300-85[5]
	Semi-auto	335.4[6]			
	Ion Sel. Elec.(ISE)			4500CN-F	
Fluoride	Ion Chromatography	300.0[6] #	D4327-91	4110B	
	Manual Distill. SPADNS			4500F-B,D	
	Manual ISE		D1179-93B	4500F-C	
	Automated ISE				380-75WE[11]
	Auto. Alizarin			4500F-E	129-71W[11]
Mercury	Manual Cold Vapor	245.1[2]	D3223-91	3112B	
	Auto. Cold Vapor	245.2[1]			
	ICP-MS	200.8[2]			
Nitrate	Ion Chromatography	300.0[6] #	D4327-91	4110B	B-1011[8]
	Auto Cd Reduction	353.2[6]	D3867-90A	4500-NO_3-F	
	Ion Selective Elec.			4500-NO_3-D	601[7]
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
Nitrite	Ion Chromatography	300.0[6] #	D4327-91	4110B	B-1011[8]
	Auto Cd Reduction	353.2[6]	D3867-90A	4500-NO_3-F	
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
	Spectrophotometric			4500-NO_2-B	
Selenium	Hydride-AA		D3859-93A	3114B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
	AA-Furnace		D3859-93B	3113B	
Thallium	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other
Lead	AA-Furnace		D3559-90D	3113B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
Copper	AA-Furnace		D1688-90C	3113B	
	AA-Direct		D1688-90A	3111B	
	ICP	200.7[2]		3120B	
	ICP-MS	200.8[2]			
	AA-Platform	200.9[2]			
pH	Electrometric	150.1[1]	D1293-84	4500-H^+-B	
		150.2[1]			
Conductivity	Conductance		D1125-91A	2510B	
Calcium	EDTA titration		D511-93A	3500-Ca-D	
	AA-Direct		D511-93B	3111B	
	ICP	200.7[2]		3120B	
Alkalinity	Titration		D1067-92B	2320B	
	Elec. titration				I-1030-85[5]
Ortho-phosphate unfiltered, no digestion or hydrolysis	Color, automated ascorbic acid	365.1[6]		4500-P-F	
	Color, ascorbic acid		D515-88A	4500-P-E	
	Color, phosphomolybdate				I-1601-85[5]
	AutoSegmented Flow				I-2601-90[5]
	Auto discrete				I-2598-85[5]
	Ion Chromatography	300.0[6]	D4327-91	4110	
Silica	Color, molybdate blue;				I-1700-85[5]
	auto seg. flow				I-2700-85[5]
	Color		D859-88		
	Molybdosilicate			4500-Si-D	
	Heteropoly blue			4500-Si-E	

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other
	Auto. molybdate reactive silica			4500-Si F	
	ICP	200.7[2]		3120B	
Temperature	Thermometric			2550B	
Sodium	ICP	200.7[2]			
	AA-Direct			3111B	
Turbidity	Nephelometric[6]	180.1		2130B	GLI Method 2[12]

FOOTNOTES

1 Methods 150.1, 150.2 and 245.2 are available from US EPA, EMSL, Cincinnati, OH 45268. The identical methods were formerly in "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1983.

2 "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB 94-184942.

3 *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

4 *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

5 Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

6 "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

7 Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water," July 1994, PN 221890-001, ATI Orion, 529 Main Street, Boston, MA 02129. This method is identical to Orion WeWWG/5880, which is approved for nitrate analysis. ATI Orion republished the method in 1994, and renumbered it as 601, because the 1985 manual "Orion Guide to Water and Wastewater Analysis," which contained WeWWG/5880, is no longer available.

8 Method B-1011, "Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography," Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

9 Method 100.1, "Analytical Method for Determination of Asbestos Fibers in Water," EPA-600/4-83-043, EPA, September 1983. Available at NTIS, PB 83-260471.

10 Method 100.2, "Determination of Asbestos Structure Over 10-μm In Length in Drinking Water," EPA-600/R-94-134, June 1994. Available at NTIS, PB 94-201902.

11 Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY 10591.

12 GLI Method 2, "Turbidity," November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223

Table IV-6 Recommended Methods for Secondary Drinking Water Contaminants

Analyses of aluminum, chloride, color, copper, fluoride, foaming agents, iron, manganese, odor, silver, sulfate, total dissolved solids (TDS) and zinc to determine compliance under §143.3 may be conducted with the methods in the following Table. Criteria for analyzing aluminum, copper, iron, manganese, silver, and zinc samples with digestion or directly without digestion, and other mandatory procedures are contained in the Technical Notes in Section IV of this document. Measurement of pH may be conducted with one of the methods listed above in Section I under "Methods for Inorganic Chemicals."

Contaminant	EPA	ASTM[1]	SM[2]	Other
Aluminum	200.7[3]		3120B	
	200.8[3]		3113B	
	200.9[3]		3111D	
Chloride	300.0[4]	D4327-91	4110B	
			4500-Cl⁻-D	
Color			2120B	
Foaming Agents			5540C	
Iron	200.7[3]		3120B	
	200.9[3]		3111B	
			3113B	
Manganese	200.7[3]		3120B	
	200.8[3]		3111B	
	200.9[3]		3113B	
Odor			2150B	
Silver	200.7[3]		3120B	I-3720-85[6]
	200.8[3]		3111B	
	200.9[3]		3113B	
Sulfate	300.0[4]	D4327-91	4110B	
	375.2[4]		4500-SO_4-F	
			4500-SO_4-C,D	
TDS			2540C	
Zinc	200.7[3]		3120B	
	200.8[3]		3111B	

"Unregulated" Inorganic Contaminants	Methods EPA	ASTM	SM
Nickel	200.7		3120B
	200.8		
	200.9		
			3111B
			3113B
Sulfate	300.0 #	D4327-91	4110B
	375.2		4500-SO_4-F
			4500-SO_4-C,D

*A Standard Methods method.

Sources for the Standard Methods and ASTM sulfate methods are referenced above under methods for inorganic chemicals. The EPA methods are contained in "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993, which is available at NTIS, PB94-121811.

NOTE REFERENCED TO EPA METHOD 300.0 IN TABLES IV B AND IV-6

 # Marking of EPA approved method 300.0 for the following parameters:

Chloride
Fluoride
Nitrate
Nitrite, and
Sulfate

signifies that our laboratory is actively in the process of switching over to ion chromatographic analysis for these analytes.

Footnotes

[1] *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

[2] *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

[3] "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB94-184942.

[4] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

[5] Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY 10591.

[6] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

Table IV-5. Sample Collection, Containers, and Preservation for Organic Contaminants

Contaminant	Method	Preservative	Container	Holding Time	
				To Extraction	After Extraction
Non-Volatile SOCs	504	3 mg/40 ml sodium thiosulfate HCl to pH 2 Cool 4° C	Glass Teflon cap liners	28 days	Analyze immediately
	505	3 mg/40 ml sodium thiosulfate Cool 4° C	Glass Teflon cap liners	14 days	Analyze immediately
	506	60 mg/l sodium thiosulfate Cool 4°C	Glass(dark) Teflon cap liners	14 days	14 days
	507	10 mg/l mercuric chloride** 80 mg/l sodium thiosulfate Cool 4° C	Glass (dark) Teflon cap liners	14 days	14 days
	508A	Cool 4° C	Glass Teflon cap liners	14 days	30 days
	508	10 mg/l mercuric chloride** 80 mg/l sodium thiosulfate Cool 4° C	Glass Teflon cap liners	7 days	14 days
	515.1	10 mg/l mercuric chloride** 80 mg/l sodium thiosulfate Cool 4° C	Glass(dark) Teflon cap liners	14 days	28 days
	525.1	40-50 mg/l sodium sulfite HCl to pH < 2 Cool 4° C	Glass Teflon cap liners	7 days	30 days
	531.1	Monochloracetic acid to pH 3 80 mg/l sodium thiosulfate Cool 4° C until storage Store at -10° C	Glass Teflon cap liners	28 days at -10°C	No extract
	547	100 mg/l sodium thiosulfate Cool 4°C	Glass(dark) Teflon cap liners	14 days	No extract
	548	Cool 4°C	Glass Teflon cap liners	7 days	1 day
	549	100 mg/l sodium thiosulfate H_2SO_4 to pH 2 Cool 4°C	Amber PVC high density. or amber silanized glass	7 days	21 days
	550	100 mg/l sodium thiosulfate 6N HCL to pH < 2 Cool 4°C	Glass(dark) Teflon cap liners	7 days	40 days
	550.1	100 mg/l sodium thiosulfate 6N HCL to pH < 2 Cool 4°C	Glass (dark) Teflon cap liners	7 days	40 days
	1613	80mg/l sodium thiosulfate Cool 4°C	Glass (dark)	—	40 days
TTHMs	501.1	3 mg/40 ml sodium thiosulfate (except for MTTHM) or Sodium Sulfite	Glass Silicon/Teflon cap liners	14 days	—
	501.2	3 mg/40 ml sodium thiosulfate (except for MTTHM) or Sodium Sulfite	Glass Silicon/Teflon cap liners	14 days	—
	510.1	Cool 4° C	Glass (dark) Silicon/Teflon cap liners	14 days	—
VOCs	502.1	25 mg/40 ml ascorbic acid or 3 mg/40 ml sodium thiosulfate 1:1 HCl to pH < 2 Cool 4° C	Glass Silicon/Teflon cap liners	14 days	—
	502.2	25 mg/40 ml ascorbic acid or 3 mg/40 ml sodium thiosulfate 1:1 HCl to pH < 2 Cool 4° C	Glass Silicon/Teflon cap liners	14 days	—
	503.1	25 mg/60 ml ascorbic acid or 3 mg/40 ml sodium thiosulfate 1:1 HCl to pH < 2 Cool 4° C	Glass Silicon/Teflon cap liners	14 days	—

Indicate Yes or No for each

Table IV-5. Sample Collection, Containers, and Preservation for Organic Contaminants

Contaminant	Method	Preservative	Y/N	Container	Y/N	Holding Time To Extraction	Y/N	Holding Time After Extraction	Y/N
	524.1	25 mg/60 ml ascorbic acid 1:1 HCl to pH < 2 Cool 4° C		Glass Silicon/Teflon cap liners		14 days		—	
	524.2	25 mg/60 ml ascorbic acid 1:1 HCl to pH < 2 Cool 4° C		Glass Silicon/Teflon cap liners		14 days		—	

The holding time for Heptachlor under this method is 7 days.

Samples that have been preserved with $HgCl_2$ may be disposed of in at least two ways: as a hazardous waste, or by passing over an absorbent column (i.e., Alumina, activated with carbon, etc.) for mercury absorption, with the effluent analyzed periodically for breakthrough. The absorbent would then be disposed of as a hazardous waste. Other techniques may be applicable.

Table IV-3 Approved Methods for Primary Organic Chemicals [§141.24(e)]

Contaminant	Method[3]
Benzene	502.2, 524.2
Carbon tetrachloride	502.2, 524.2, 551
Chlorobenzene	502.2, 524.2
1,2-Dichlorobenzene	502.2, 524.2
1,4-Dichlorobenzene	502.2, 524.2
1,2-Dichloroethane	502.2, 524.2
cis-1,2-Dichloroethylene	502.2, 524.2
trans-1,2-Dichloroethylene	502.2, 524.2
Dichloromethane	502.2, 524.2
1,2-Dichloropropane	502.2, 524.2
Ethylbenzene	502.2, 524.2
Styrene	502.2, 524.2
Tetrachloroethylene	502.2, 524.2, 551
1,1,1-Trichloroethane	502.2, 524.2, 551
Trichloroethylene	502.2, 524.2, 551
Toluene	502.2, 524.2
1,2,4-Trichlorobenzene	502.2, 524.2
1,1-Dichloroethylene	502.2, 524.2
1,1,2-Trichloroethane	502.2, 524.2
Vinyl chloride	502.2, 524.2
Xylenes (total)	502.2, 524.2
2,3,7,8-TCDD (dioxin)	1613
2,4-D	515.2, 515.1, 555
Alachlor	505[1], 507, 508.1, 525.2
Atrazine	505[1], 507, 508.1, 525.2
Benzo(a)pyrene	525.2, 550, 550.1
Carbofuran	531.1, 6610
Chlordane	505, 508, 508.1, 525.2

Contaminant	Method[3]
Dalapon	515.1, 552.1
Di(2-ethylhexyl)adipate	506, 525.2
Di(2-ethylhexyl)phthalate	506, 525.2
Dibromochloropropane (DBCP)	504.1, 551
Dinoseb	515.2,515.1, 555
Diquat	549.1
Endothall	548.1
Endrin	505, 508, 508.1, 525.2
Ethylene dibromide (EDB)	504.1, 551
Glyphosate	547, 6651
Heptachlor	505, 508, 508.1, 525.2
Heptachlor Epoxide	505, 508, 508.1, 525.2
Hexachlorobenzene	505, 508, 508.1, 525.2
Hexachlorocyclopentadiene	505, 508, 508.1, 525.2
Lindane	505, 508, 508.1, 525.2
Methoxychlor	505, 508, 508.1, 525.2
Oxamyl	531.1, 6610
PCBs (as decachlorobiphenyl)[2] (as Aroclors)	508A 505, 508
Pentachlorophenol	515.1, 515.2, 525.2, 555
Picloram	515.1, 515.2, 555
Simazine	505[1], 507, 508.1, 525.2
2,4,5-TP (Silvex)	515.1, 515.2, 555
Toxaphene	505, 508, 525.2
Total Trihalomethanes	502.2, 524.2, 551

[1] A nitrogen-phosphorous detector should be substituted for the electron capture detector in Method 505 (or another approved method should be used) to determine alachlor, atrazine and simazine, if lower detection limits are required.

[2] PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl using Method 508A.

[3] Methods 502.2, 505, 507, 508, 508A, 515.1 and 531.1 are in Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991. Methods 506, 547, 550, 550.1 and 551 are in Methods for the Determination of Organic Compounds in Drinking Water -

Footnotes

[1] *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

[2] *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

[3] "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB94-184942.

[4] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

[5] Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY 10591.

[6] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

Table IV-4 Approved Methods for "Unregulated" Contaminants (§141.40)

Regulations specified in §141.40 require monitoring for certain contaminants to which maximum contaminant levels do not apply. These chemicals are called "unregulated" contaminants, and presently include sulfate, 34 volatile organic chemicals (VOCs) and 13 synthetic organic chemicals (SOCs).

Analysis for the 34 unregulated VOCs listed under paragraphs (e) and (j) of §141.40 shall be conducted using the following recommended methods, or their equivalent as determined by EPA.

"Unregulated" VOC Contaminants	Method
Chloroform	502.2, 524.2, 551
Bromodichloromethane	502.2, 524.2, 551
Bromoform	502.2, 524.2, 551
Chlorodibromomethane	502.2, 524.2, 551
Bromobenzene	502.2, 524.2
Bromomethane	502.2, 524.2
Chloroethane	502.2, 524.2
Chloromethane	502.2, 524.2
o-Chlorotoluene	502.2, 524.2
p-Chlorotoluene	502.2, 524.2
Dibromomethane	502.2, 524.2
m-Dichlorobenzene	502.2, 524.2
1,1-Dichloroethane	502.2, 524.2
1,3-Dichloropropane	502.2, 524.2
2,2-Dichloropropane	502.2, 524.2
1,1-Dichloropropene	502.2, 524.2
1,3-Dichloropropene	502.2, 524.2
1,1,2,2-Tetrachloroethane	502.2, 524.2
1,1,1,2-Tetrachloroethane	502.2, 524.2
1,2,3-Trichloropropane	502.2, 524.2, 504.1

State Discretionary Contaminants	METHODS
Bromochloromethane	502.2, 524.2
n-Butylbenzene	502.2, 524.2
sec-Butylbenzene	502.2, 524.2

Circle Method Used

Table IV-2. Approved Methodology for Organic Contaminants

Contaminant	MCL mg/l	Methodology	Reference EPA[1]
Non-Volatile SOCs			
Adipates [Di(ethylhexyl)adipate]	0.4	Gas Chromatography-Liquid/Liquid or Liquid/Solid Extraction-Photoionization Detector	506[2]
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Alachlor	0.002	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Nitrogen/Phosphorus Detector	507
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Aldicarb*	–	High Performance Liquid Chromatography-Post Column Reactor	531.1
Aldicarb sulfoxide*	–	High Performance Liquid Chromatography-Post Column Reactor	531.1
Aldicarb sulfone*	–	High Performance Liquid Chromatography-Post Column Reactor	531.1
Atrazine	0.003	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Nitrogen/Phosphorus Detector	507
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Carbofuran	0.04	High Performance Liquid Chromatography-Post Column Reactor	531.1
Chlordane	0.002	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Electron Capture Detector	508
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Dalapon	0.2	Gas Chromatography-Electron Capture Detector	515.1
Dibromochloropropane(DBCP)	0.0002	Gas Chromatography-Microextraction-Electron Capture Detector	504
2,4-D	0.07	Gas Chromatography-Electron Capture Detector	515.1**
Dinoseb	0.007	Gas Chromatography-Electron Capture Detector	515.1
Diquat	0.02	High Performance Liquid Chromatography-Liquid/Solid Extraction-Ultraviolet Detector	549[2]
Endothall	0.1	Gas Chromatography-Liquid/Solid Extraction-Electron Capture Detector	548[2]
Endrin	0.002	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Electron Capture Detector	508
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Ethylene dibromide (EDB)	0.00005	Gas Chromatography-Microextraction-Electron Capture Detector	504
Glyphosate	0.7	High Performance Liquid Chromatography-Post Column Reactor-Fluorescent Detector	547[2]
Heptachlor	0.0004	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Electron Capture Detector	508
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Heptachlor epoxide	0.0002	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Electron Capture Detector	508
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1
Hexachlorobenzene	0.001	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Electron Capture Detector	508
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction-/Mass Spectroscopy	525.1
Hexachlorocyclopentadiene	0.05	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction-/Mass Spectroscopy	525.1
Lindane	0.0002	Gas Chromatography-Microextraction-Electron Capture Detector	505
		Gas Chromatography-Electron Capture Detector	508
		Capillary Column-Gas Chromatography-Liquid/Solid Extraction /Mass Spectroscopy	525.1

Table IV-2. Approved Methodology for Organic Contaminants

Contaminant	MCL mg/l	Methodology	Reference EPA[1]
p-Dichlorobenzene	0.075	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Gas Chromatography-Photoionization Detector	503.1
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
o-Dichlorobenzene	0.6	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Gas Chromatography-Photoionization Detector	503.1
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
1,2-Dichloroethane	0.005	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
1,1-Dichloroethylene	0.007	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
c-1,2-Dichloroethylene	0.07	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Packed Capillary-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
t-1,2-Dichloroethylene	0.1	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
Dichloromethane(Methylene chloride)	0.005	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
1,2-Dichloropropane	0.005	Purge and Trap; Gas Chromatography-Electrolytic Conductivity Detector	502.1
		Purge and Trap; Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap; Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap; Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
Ethylbenzene	0.7	Purge and Trap;Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap;Gas Chromatography-Photoionization Detector	503.1
		Purge and Trap;Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap;Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2
Styrene	0.1	Purge and Trap;Capillary Column-Gas Chromatography-Photoionization Detector-Electrolytic Conductivity Detector	502.2
		Purge and Trap;Gas Chromatography-Photoionization Detector	503.1
		Purge and Trap;Packed Column-Gas Chromatography/Mass Spectroscopy	524.1
		Purge and Trap;Capillary Column-Gas Chromatography/Mass Spectroscopy	524.2

Performance Evaluation Report
USEPA Water Supply Study MICRO 030

Report: PE005
Page: 1
Date: 09JUN98

Participant ID: WV00902 Type: STATE Requesting Office: RC3

	Sample Number	Reported Value	True Value	Performance Evaluation
MICROBIOLOGICAL ANALYTES:				
175-TOTAL COLIFORM, MF (A)				
	01	0	0	Accept.
	02	1	1	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	0	0	Accept.
178-FEC COLI/E COLI, MF (A)				
	01	0	0	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	0	0	Accept.
	06	0	0	Accept.
181-TOTAL COLIFORM, MTF (A)				
	01	0	0	Accept.
	02	1	1	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	0	0	Accept.
184-FEC COLI/E COLI, MTF (A)				
	01	0	0	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	0	0	Accept.
	06	0	0	Accept.
206-TOTAL COLIFORM, MTF (B)				
	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	0	0	Accept.
212-FEC COLI/E COLI, MTF (B)				
	01	0	0	Accept.
	02	0	0	Accept.
	03	0	0	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	0	0	Accept.

(OVER) →

Performance Evaluation Report
USEPA Water Supply Study MICRO 030

Participant ID: WV00902 Type: STATE Requesting Office: R03

	Sample Number	Reported Value	True Value	Performance Evaluation
227-TOTAL COLI, MMO-MUG (B)				
	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	0	0	Accept.
231-F COL/E COL,MMO-MUG (B)				
	01	0	0	Accept.
	02	0	0	Accept.
	03	0	0	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	0	0	Accept.

********** END OF DATA FOR WV00902 **********
********** END OF REPORT FOR WV00902 **********

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

SEP 24 1998

Dr. Frank W. Lambert Jr.
State Hygienic Laboratory
West Virginia State Health Department
167 11th Avenue
South Charleston, W.VA. 25303

Dear Dr. Lambert:

The Microbiology Performance Evaluation Study for Water Supply Laboratories has been completed by the National Exposure Research Laboratory in Cincinnati (NERL-Cincinnati). Your laboratory's report for Water supply Microbiology Study 30 (WSM030) was sent to you under a separate cover.

The laboratory report shows that the results for all the coliform techniques reported were acceptable. You and your staff should be congratulated for their performance on WSM030. To maintain certification for any of the microbiological techniques or procedures, your laboratory must analyze and obtain acceptable results once a year in the Microbiological Performance Evaluation Studies using that technique or procedure. Based on the Performance Evaluation Study (WSM030), your laboratory's certification status is as follows:

Microbiological: Certified: Total Coliform/Escherichia coli:
MF technique, Total Coliform
MF technique, Fecal Coliform/E Coli
MTF technique, Total Coliform
MTF technique, Fecal Coliform/E Coli
MMO-MUG procedure, Total Coliform
MMO-MUG procedure, Fecal Coliform/E Coli

If you have any questions, please contact my office.

Sincerely,

for Stanley L. Laskowski, Director
Environmental Services Division
Water Supply Laboratory Certification Authority

cc: Thomas J. Maslany, Director, Water Protection Division

STAPLE
HERE

OMB#2080-0021
(Exp. 10/2000)

WATER SUPPLY MICROBIOLOGY PERFORMANCE EVALUATION STUDY
U.S. ENVIRONMENTAL PROTECTION AGENCY
STUDY NO. MICRO 030

MAY 12 1998

WV00902 S
WV DEPT. OF HEALTH
THOMAS L. ONG
OFFICE OF LAB SERVICES
167 11TH AVE.
SOUTH CHARLESTON, WV 25303

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES
CHARLESTON, WV 25305
OFFICE OF LABORATORY SERVICES
167 11th Avenue
South Charleston, WV 25303

Send Completed Original to:

Ms Natalie Murff
USEPA, NERL, EERD, NWQAPB
26 West M.L. King Drive, Room 525
Cincinnati, OH 45268

The EPA must RECEIVE this form by May 11, 1998

REPORT APPROVED BY:

FRANK W. LAMBERT	[signature]	DIRECTOR LAB	(304) 558-3530	5/6/98
NAME (Print)	SIGNATURE	TITLE	TELEPHONE	DATE

This report is authorized by law (Public Laws 93-523 and 99-339). Successful annual participation in a water supply study or its equivalent is mandatory for every analyte or analyte group for which a drinking water laboratory is certified to conduct official analyses.

Paperwork Reduction Act Notice

Public reporting burden for this collection of information is estimated to average 5.34 hours per respondent annually. The estimate is based on analysis for an average of two analytes per respondent. The estimate includes time for reading instructions, preparation of the performance samples, analyses, and gathering and reporting of the information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M. Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

EPA-419 (Cin) Rev. 3/98. Previous editions are obsolete.

WATER SUPPLY MICROBIOLOGY DATA REPORT FORM

For Kit A, report TOTAL and FECAL/E. COLI Coliform data for **one** of the following: MF, MTF, or P-A.
SELECT ONLY ONE. Reporting additional data will invalidate results.

STUDY NUMBER								EPA LAB ID							
M	I	C	R	O	0	3	0	W	V	0	0	9	0	2	

KIT A RESULTS

Enter "1" for Positive (Present) or "0" for Negative (Absent)

ANALYTE NUMBER & ANALYTE NAME		METHOD CODE	SAMPLE 1	2	3	4	5	6
MF: MEMBRANE FILTRATION								
175	**TOTAL COLIFORM**	12	0	1	1	0	1	0
178	**FECAL COLIFORM/E COLI**	34	0	0	1	0	0	0
MTF: MULTIPLE TUBE FERMENTATION								
181	**TOTAL COLIFORM**	29	0	1	1	0	1	0
184	**FECAL COLIFORM/E COLI**	34	0	0	1	0	0	0
P-A: PRESENCE - ABSENCE								
187	**TOTAL COLIFORM**							
190	**FECAL COLIFORM/E COLI**							

WATER SUPPLY MICROBIOLOGY DATA REPORT FORM

For Kit B, report TOTAL and FECAL/E. COLI Coliform data for **one** of the following: CHROMOGENIC/FLUOROGENIC, MTF, or P-A.
SELECT ONLY ONE. Reporting additional data will invalidate results.

STUDY NUMBER	EPA LAB ID
MICRO030	WY00902

KIT B RESULTS

Enter "1" for Positive (Present) or "0" for Negative (Absent)

ANALYTE NUMBER & ANALYTE NAME	METHOD CODE	SAMPLE 1	2	3	4	5	6
CHROMO-FLUORO: CHROMOGENIC/FLUOROGENIC							
227 TOTAL COLIFORM	40	1	0	1	0	1	0
231 E COLI	41	0	0	0	0	1	0
MTF: MULTIPLE TUBE FERMENTATION							
208 TOTAL COLIFORM	31	1	0	1	0	1	0
212 FECAL COLIFORM/E COLI	34	0	0	0	0	1	0
P-A: PRESENCE - ABSENCE							
218 TOTAL COLIFORM							
222 FECAL COLIFORM/E COLI							

Report: PE005
Page: 1
Date: 18NOV97

Performance Evaluation Report
USEPA Water Supply Study MICRO 029

Participant ID: WV00902 Type: STATE Requesting Office: R03

	Sample Number	Reported Value	True Value	Performance Evaluation
MICROBIOLOGICAL ANALYTES:				
175-TOTAL COLIFORM, MF (A)	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	1	1	Accept.
	05	1	1	Accept.
	06	1	1	Accept.
178-FEC COLI/E COLI, MF (A)	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	1	1	Accept.
181-TOTAL COLIFORM, MTF (A)	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	1	1	Accept.
	05	1	1	Accept.
	06	1	1	Accept.
184-FEC COLI/E COLI, MTF (A)	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	1	1	Accept.
208-TOTAL COLIFORM, MTF (B)	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	1	1	Accept.
212-FEC COLI/E COLI, MTF (B)	01	0	0	Accept.
	02	0	0	Accept.
	03	0	0	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	1	1	Accept.

(OVER) →

Participant ID: WV00902 Type: STATE Requesting Office: R03

	Sample Number	Reported Value	True Value	Performance Evaluation
227-TOTAL COLI, MMO-MUG (B)				
	01	1	1	Accept.
	02	0	0	Accept.
	03	1	1	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	1	1	Accept.
231-F COL/E COL,MMO-MUG (B)				
	01	0	0	Accept.
	02	0	0	Accept.
	03	0	0	Accept.
	04	0	0	Accept.
	05	1	1	Accept.
	06	1	1	Accept.

********** END OF DATA FOR WV00902 **********
********** END OF REPORT FOR WV00902 **********

STAPLE
HERE

OMB#2080-0021
(Exp. 10/97)

WATER SUPPLY MICROBIOLOGY PERFORMANCE EVALUATION STUDY
U.S. ENVIRONMENTAL PROTECTION AGENCY
STUDY NO. MICRO 029

WV00902 S
WV DEPT. OF HEALTH
THOMAS L. ONG
OFFICE OF LAB SERVICES
167 11TH AVE.
SOUTH CHARLESTON, WV 25303

WVA 00202

Send Completed Original to:

Ms Natalie Murff
USEPA, NERL, EERD, NWQAPB
26 West M.L. King Drive, Room 525
Cincinnati, OH 45268

The EPA must RECEIVE this form by October 20, 1997

REPORT APPROVED BY:

THOMAS L. ONG	[signature]	MICROBIOLOGIST SUPERVISOR	(304) 558-3530	10-15-
NAME (Print)	SIGNATURE	TITLE	TELEPHONE	DATE

This report is authorized by law (Public Laws 93-523 and 99-339). Successful annual participation in a water supply study or its equivalent is mandatory for every analyte or analyte group for which a drinking water laboratory is certified to conduct official analyses.

Paperwork Reduction Act Notice

Public reporting burden for this collection of information is estimated to average 5.34 hours per respondent annually. The estimate is based on analysis for an average of two analytes per respondent. The estimate includes time for reading instructions, preparation of the performance samples, analyses, and gathering and reporting of the information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M. Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

EPA-419 (Cin) Rev. 8/97. Previous editions are obsolete.

WATER SUPPLY MICROBIOLOGY DATA REPORT FORM

For Kit A, report TOTAL and FECAL/E. COLI Coliform data for **one** of the following: MF, MTF, or P-A. **SELECT ONLY ONE.** Reporting additional data will invalidate results.

STUDY NUMBER	EPA LAB ID	
M I C R O 0 2. 9	W V 0 0 9 0 2	

KIT A RESULTS

Enter "1" for Positive (Present) or "0" for Negative (Absent)

ANALYTE NUMBER & ANALYTE NAME	METHOD CODE	SAMPLE 1	2	3	4	5	6
MF: MEMBRANE FILTRATION							
175 **TOTAL COLIFORM**	2 3	1	0	1	1	1	1
178 **FECAL COLIFORM/E COLI**	3 4	1	0	1	0	1	1
MTF: MULTIPLE TUBE FERMENTATION							
181 **TOTAL COLIFORM**	2 9	1	0	1	1	1	1
184 **FECAL COLIFORM/E COLI**	3 4	1	0	1	0	1	1
P-A: PRESENCE - ABSENCE							
187 **TOTAL COLIFORM**							
190 **FECAL COLIFORM/E COLI**							

EPA-419 (Cin) Rev. 8/97. Previous editions are obsolete.

WATER SUPPLY MICROBIOLOGY DATA REPORT FORM

For Kit B, report TOTAL and FECAL/E. COLI Coliform data for **one** of the following: CHROMOGENIC/FLUOROGENIC, MTF, or P-A.
SELECT ONLY ONE. Reporting additional data will invalidate results.

STUDY NUMBER	EPA LAB ID
MICRO029	WV00902

KIT B RESULTS

Enter "1" for Positive (Present) or "0" for Negative (Absent)

ANALYTE NUMBER & ANALYTE NAME	METHOD CODE	SAMPLE 1	2	3	4	5	6
CHROMO-FLUORO: CHROMOGENIC/FLUOROGENIC							
227 TOTAL COLIFORM	40	1	0	1	0	1	1
231 E COLI	41	0	0	0	0	1	1
MTF: MULTIPLE TUBE FERMENTATION							
208 TOTAL COLIFORM	31	1	0	1	0	1	1
212 FECAL COLIFORM/E COLI	34	0	0	0	0	1	1
P-A: PRESENCE - ABSENCE							
218 TOTAL COLIFORM							
222 FECAL COLIFORM/E COLI							

EPA-419 (Cin) Rev. 8/97. Previous editions are obsolete.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

JAN 2 3 1998

Dr. Frank W. Lambert Jr., Director
State Hygienic Laboratory
West Virginia State Health Department
167 11th Avenue
South Charleston, W.VA. 25303

Dear Dr. Lambert:

The Microbiology Performance Evaluation Study for Water Supply Laboratories has been completed by the National Exposure Research Laboratary in Cincinnati (NERL-Cincinnati). Enclosed is your laboratory's report for that study, WSM029.

The laboratory report shows that the results for all the coliform techniques reported were acceptable. You and your staff should be congratulated for their performance on WSM029. Based on the Performance Evaluation Study (WSM029), your laboratory's certification status is as follows:

Microbiological:

Certified: Total Coliform/Escherichia coli:

MF technique, Total Coliform
MF technique, Fecal Coliform/E Coli
MTF technique, Total Coliform
MTF technique, Fecal Coliform/E Coli
MMO-MUG procedure, Total Coliform
MMO-MUG procedure, Fecal Coliform/E Coli

If you have any questions, please contact my office.

Sincerely,

Stanley L. Laskowski, Director
Environmental Services Division
Water Supply Laboratory Certification Authority

Enclosures

cc: Thomas J. Maslany, Director, Water Protection Division

Customer Service Hotline: 1-800-438-2474

From: JOE SLAYTON
To: dmrqa
Date: 10/26/99 5:50pm
Subject: PT suppliers

Approved by nist at :

http://ts.nist.gov/ts/htdocs/210/214/214.htm

if you have trouble with this address go to Nist.gov and search around.

"The Magnificent Seven:"

ERA; Absolute Stds.; Chrisope Tech.; Protocol Analtyical Supplies; NYS DOH; Analytical Products Group; Ultra Scientific.

CC: ESC_OASQA

Analytical Stds Inc.

V. SDWA (PLEASE COMPLETE AND RETURN WITH PRE-SURVEY PACKAGE)

MICROBIOLOGY LABORATORY ANALYSIS REVIEW CHECKLIST

LABORATORY West Virginia Department of Health & Human Resources
Bureau for Public Health
Office of Laboratory Services

ADDRESS 167 11th Avenue
South Charleston, WV 25303

TELEPHONE NUMBER/FAX NUMBER (304) 558-3530 / (304) 558-2006

CONDUCTED BY

DATE

NAMES/TITLES/RESPONSIBILITIES OF KEY PERSONNEL INTERVIEWED

V. SDWA (Please Complete and Return with PreSurvey Package)

Element	Yes	No	Comments
1. PERSONNEL			
1.1 Supervisor/Consultant			
Supervisor of analyst has a bachelor's degree in microbiology, biology, or equivalent with at least one college-level laboratory course in environmental microbiology, and has a minimum of two weeks course training or 80 hours of on-the-job training in water microbiology at a certified laboratory, or other training acceptable to the State or EPA	X		
If supervisor not available, consultant with same training and experience substituted, acceptable to the State, and present on-site frequently enough to satisfactorily perform a supervisor's duties	X		
1.2 Analyst (or equivalent job title)			
Analyst has a high school education, 3 months bench experience in microbiology, training in microbiological analysis of drinking water acceptable to the State (or EPA) and a minimum of 30 days on-the-job training under an experienced analyst	X		
Analyst demonstrated acceptable results for precision, specificity, and satisfactory analysis on unknown samples before analyzing compliance samples			
1.3 Waiver of Academic Training Requirement			
Need for specified academic training waived for highly experienced analysts	X		
1.4 Personnel Records			
Personnel records maintained on laboratory analysts include academic background, specialized training courses completed and types of microbiological analyses conducted	X		
2. LABORATORY FACILITIES			
Laboratory facilities clean, temperature and humidity controlled, with adequate lighting at bench top	X		
Sufficient space available for processing samples, bench top equipment, storage, cleaning glassware and sterilizing materials	X		
Provisions made for disposal of microbiological wastes	X		
3. LABORATORY EQUIPMENT AND SUPPLIES			
3.1 pH meter			
Accuracy and scale graduations within $\pm$ 0.1 units	X		
Buffer aliquot used only once	X		

Element	Yes	No	Comments
Electrodes maintained according to manufacturer's recommendations	X		
QC Meter standardized each use period with pH 7.0 and either 4.0 or 10.0 buffers, with date and buffers used recorded in log book 4/7/10 Three	X		3 pt calibration with slope
QC Commercial buffer solutions dated when received and opened and discarded before expiration date	X		
3.2. Balance (top loader or pan)			
Readability of 0.1 g	X		
QC Calibrated monthly using ASTM type 1, 2, or 3 weights (minimum 3 traceable weights which bracket laboratory weighing needs)	X		
QC Non-reference weights calibrated every six months with reference weights	X		
QC Annual service contract or internal maintenance protocol established, records available of most recent recalibration, and correction values on file and used	X		
QC Reference weight recertified if damaged or corroded	---		
3.3 Temperature Monitoring Device			
Temperature monitoring devices graduated in 0.5°C increments (0.2°C increments for tests which are incubated at 44.5°C) or less	X		
No separation in fluid column of glass thermometer	X		
No dial thermometers used which cannot be adjusted	---		
QC Glass and electronic thermometers calibrated annually, dial thermometers quarterly, at the temperature used against reference NIST thermometer or one meeting the requirements of NBS Monograph SP 250-23	X =		
QC Calibration factor marked on thermometer and calibration date and calibration factor recorded in QC record book	X		
QC Thermometer discarded if off more than 1°C from reference thermometer, reference thermometers recalibrated every 3-5 years	X		
QC Continuous recording devices used to monitor incubator temperature recalibrated annually as above	---		
3.4 Incubator Unit			
Incubator units have an internal temperature monitoring device and maintain temperature of 35 ± 0.5°C, and if used, 44.5 ± 0.2°C	X		

Element	Yes	No	Comments
Electrodes maintained according to manufacturer's recommendations	X		
QC Meter standardized each use period with pH 7.0 and either 4.0 or 10.0 buffers, with date and buffers used recorded in log book 4/7/10 Three	X		3 pt calibration with slope
QC Commercial buffer solutions dated when received and opened and discarded before expiration date	X		
3.2. Balance (top loader or pan)			
Readability of 0.1 g	X		
QC Calibrated monthly using ASTM type 1, 2, or 3 weights (minimum 3 traceable weights which bracket laboratory weighing needs)	X		
QC Non-reference weights calibrated every six months with reference weights	X		
QC Annual service contract or internal maintenance protocol established, records available of most recent recalibration, and correction values on file and used	X		
QC Reference weight recertified if damaged or corroded	---		
3.3 Temperature Monitoring Device			
Temperature monitoring devices graduated in 0.5°C increments (0.2°C increments for tests which are incubated at 44.5°C) or less	X		
No separation in fluid column of glass thermometer	X		
No dial thermometers used which cannot be adjusted	---		
QC Glass and electronic thermometers calibrated annually, dial thermometers quarterly, at the temperature used against reference NIST thermometer or one meeting the requirements of NBS Monograph SP 250-23	X =		
QC Calibration factor marked on thermometer and calibration date and calibration factor recorded in QC record book	X		
QC Thermometer discarded if off more than 1°C from reference thermometer, reference thermometers recalibrated every 3-5 years	X		
QC Continuous recording devices used to monitor incubator temperature recalibrated annually as above	---		
3.4 Incubator Unit			
Incubator units have an internal temperature monitoring device and maintain temperature of 35 ± 0.5°C, and if used, 44.5 ± 0.2°C	X		

Element	Yes	No	Comments
Overcrowding avoided	X		
Oven thermometer graduated in 10°C increments or less, with bulb placed in sand during use	X		
QC Date, contents, sterilization time, temperature, and analyst's initials recorded for each cycle	X		
QC Spore strip or ampule used monthly	X		
3.7 Colony Counter			
Colony counter, dark field model, used to count Heterotrophic Plate Count colonies	X		
3.8 Conductivity Meter			
Suitable for checking laboratory reagent-grade water, readable in micromhos/cm or microsiemens/cm with measurement error not exceeding 1% or 1 micromhos/cm, whichever is more lenient	X		
QC Cell constant determined monthly	X		
In-line unit which cannot be calibrated not used to check reagent-grade water	X		
3.9 Refrigerator			
Maintains 1-5°C	X		
Thermometer graduated in 1°C increments or less, with thermometer bulb immersed in liquid	X		
QC Temperature recorded for days in use at least once per day	X		2 times per day
3.10 Inoculating Equipment			
Sterile metal or disposable plastic loops, wood applicator sticks, sterile swabs, or sterile plastic disposable pipet tips used	X		
Wood applicator sticks sterilized by dry heat	X		
Metal inoculating loops and needles made of nickel alloy or platinum (nickel alloy loops not used for oxidase test)	X		
3.11 Membrane Filtration (MF) Equipment			
MF units of stainless steel, glass, or autoclavable plastic, not scratched or corroded and do not leak	X		
QC Graduations on funnels used to measure sample volume checked for accuracy have tolerance of ≤2.5%, and a record of this calibration check retained	—		Used only on special projects. Only dilutions.
10x to 15x stereo microscope with fluorescent light source used to count sheen colonies	X		

Element	Yes	No	Comments
Membrane filters approved by manufacturer for use in total coliform analysis of water	X		
Membrane filters of cellulose ester, white, gridmarked, 47 mm diameter, and 0.45 μm pore size	X		
Membrane filters and pads purchased presterilized or autoclaved before use	X		
Lot number and date received recorded for membrane filters	X		
3.12 Culture Dishes (loose or tight lids)			
Presterilized plastic or sterilizable glass culture dishes used	X		
Sterility of glass culture dishes maintained by placement in stainless steel or aluminum canisters or wrapped in heavy aluminum foil or char-resistant paper	X		
Loose-lid dishes incubated in tight-fitting container with moistened paper towel	X		
Opened packs of disposable culture dishes resealed between use periods	X		
3.13 Pipets			
Glass pipets sterilized and maintained in stainless steel or aluminum canisters or wrapped individually in char-resistant paper or aluminum foil	X		
Pipets with legible markings, not chipped or etched	X		
Opened packs of disposable sterile pipets resealed between use periods	X		
Pipets delivering volumes of 10 mL or less accurate within 2.5% tolerance	X		
Micropipetters used with sterile tips,calibrated annually, and replaced if tolerance greater than 2.5%			
3.14 Culture Tubes and Closures			
Tubes of borosilicate glass or other corrosion-resistant glass or plastic	X		
Culture tubes and containers of sufficient size to contain medium plus sample without being more than three quarters full	X		
Tube closures used of stainless steel, plastic, aluminum, or screw caps with non-toxic liner; cotton plugs not used	X		
3.15 Sample Containers			

Element	Yes	No	Comments
Required times for autoclaving material at 121°C (except for membrane filters and pads and carbohydrate-containing media, indicated times represent minimum times, dependent upon volumes, containers, and loads): - membrane filters and pads 10 min - carbohydrate containing media 12-15 min - contaminated test materials 30 min - membrane filter assemblies 15 min - sample collection containers 15 min - individual glassware 15 min - dilution water blank 15 min - rinse water (0.5 - 1 L) 15-30 min* * time depends upon water volume per container and autoclave load	--- X X X X X X		45 min @132° C 30 minutes 60 minutes
Autoclaved membrane filters and pads and all media removed immediately after completion of sterilization cycle	---		
Membrane filter equipment autoclaved before beginning of first filtration series (filtration series ends when 30 minutes or longer elapses after a sample filtered)	X		
When UV light (254 nm) used to sanitize equipment, all supplies presterilized and QC checks conducted on UV lamp	---		
UV light used to control bacterial carry-over between samples during filtration series (optional)	---		
4.2 Sample Containers			
QC. Sterility of each lot of sample containers or bags confirmed by adding 25 mL of a sterile non-selective broth to at least one container, incubating at 35 ± 0.5°C for 24 hours and checking for growth	X		
4.3 Reagent-Grade Water			
Only satisfactorily tested reagent water from stills or deionization units used to prepare media, reagents and dilution/rinse water	X		

Element	Yes	No	Comments
Wide-mouth plastic or non-corrosive glass bottles, with non-leaking ground glass stoppers or caps with non-toxic liners, or sterile plastic bags containing sodium thiosulfate used	X		
Sample container capacity at least 120 mL (4 oz)	X		
Glass stoppers covered with aluminum foil or char-resistant paper for sterilization	---		
Sample containers sterilized by autoclaving or (for glass bottles) dry heat	X		
Containers moistened with several drops of water before autoclaving to prevent "air lock" sterilization failure	X		
Sufficient sodium thiosulfate added to sample containers before sterilization, if laboratory analyzes chlorinated water	X		
3.16 Glassware and Plasticware			
Glassware made of borosilicate glass or other corrosion-resistant glass, free of chips and cracks, with markings legible	X		
Plastic items clear and non-toxic to microorganisms	X		
QC Graduated cylinders and pre-calibrated containers used to measure samples volumes accurate with a tolerance of 2.5% or less	X		
QC New lots of pre-calibrated containers validated to have 2.5% tolerance	X		
3.17 Ultraviolet Lamp (if used)			
Unit cleaned monthly by wiping with soft cloth moistened with ethanol	---		
QC If used for sanitization, tested quarterly with UV light meter or by agar spread plate method (other methods acceptable if data demonstrates they are as effective)	---		
4. GENERAL LABORATORY PRACTICES			
Laboratory facilities clean, temperature and humidity controlled, and adequate lighting			
4.1 Sterilization Procedures			

Element			Yes	No	Comments
QC Quality of reagent water should be tested and meets the following criteria:					
- conductivity	<2 micromhos/cm (microsiemens/cm) at 25°C	monthly	X		
- Pb, Cd, Cr Cu, Ni, Zn	not greater than 0.05 mg/L per contaminant, and no greater than 0.1 mg/L total	annually	X		
- total chlorine residual*	<0.1 mg/L	monthly	X		
- heterotrophic plate count*	<500/mL	monthly	X		
- bacteriological quality of reagent water*	ratio of growth rate 0.8:3.0	annually	---		No longer required.
*See section 4.3.2 of this chapter for additional details					
4.4 Dilution/Rinse Water					
Stock buffer solution or peptone water prepared as specified in Standard Methods			X		
Stock buffers autoclaved or filter-sterilized and containers labeled, dated, and refrigerated			X		
Stored stock buffer free of turbidity			X		
QC Each batch of dilution/rinse water checked for sterility by adding 50 mL of water to 50 mL double strength non-selective broth, incubating at 35 ± 0.5°C for 24 hours, and checking for growth			X		
4.5 Glassware Washing					
Distilled or deionized water used for final rinse			X		
QC Glassware inhibitory residue test performed on initial use of washing compound and whenever different formulation or washing procedure used			X		
QC Batches of dry glassware spot-checked for pH reaction			X		
Laboratory glassware washed with detergent designed for laboratory use			X		
5. ANALYTICAL METHODOLOGY					
5.1 General					

Element	Yes	No	Comments
Only analytical methodology specified in Total Coliform Rule and Surface Water Treatment Rule used for compliance samples	X		
Laboratory certified for all analytical methods it uses for compliance purposes	X		
Laboratory certified for at least one total coliform method and one fecal coliform or *E. coli* method	X		
Laboratory certified for a second total coliform method, if one method cannot be used for some drinking waters	X		
Laboratory that enumerates heterotrophic bacteria (i.e., HPC) for compliance with the Surface Water Treatment Rule certified for the Pour Plate Method	X		
Absorbent pads, when used, saturated with liquid medium and excess removed	X		
Water sample shaken vigorously (about 25 times) before analysis	X		
QC If no total coliform-positive results occur during a quarter, laboratory performs coliform procedure using a known coliform-positive, fecal coliform- and/or *E. coli*-positive control to spike the sample	X		
Sample volume analyzed for total coliforms in drinking water is 100 ± 2.5 mL	X		
Media			
Dehydrated or prepared media manufactured commercially used (strongly recommended)	X		
Dehydrated media stored in cool dry location and caked or discolored dehydrated media discarded	X		
QC Laboratory media preparation records include: - date of preparation - type of medium - lot number - sterilization time and temperature - final pH - technician's initials	--- X X X X X X		
QC For liquid media prepared commercially, the following are recorded: - date received - type of medium - lot number - pH verification	---		
QC Liquid media prepared commercially discarded by manufacturer's expiration date	---		

Element	Yes	No	Comments
QC Each new lot of dehydrated and prepared commercial medium checked before use with positive and negative culture controls and results recorded	X		
QC Each new batch of laboratory-prepared medium checked before use with positive and negative culture controls and results recorded	X		
Prepared plates refrigerated in sealed plastic bags or containers not longer than two weeks, with bag or container dated with preparation or expiration date	X		
Loose-cap tubes of broth stored at <30°C no longer than two weeks, tightly capped tubes no longer than 3 months at <30°C	X		
Refrigerated medium incubated at room temperature overnight before use and discarded if growth observed	X		
QC Parallel testing performed between a newly approved test procedure and another EPA-approved procedure for several months and/or several seasons (recommended)	X		
5.2 Membrane Filter (MF) Technique (for total coliforms in drinking water)	---		
Media			
M-Endo broth or agar or LES Endo agar in single step or enrichment technique used	---		
Ethanol not denatured	---		
Medium prepared in sterile flask and dissolved using boiling water bath or hot plate with stir bar	---		
Medium not boiled	---		
LES Endo agar medium pH 7.2 ± 0.2 M-Endo medium pH 7.2 ± 0.1	---		
MF broth refrigerated no longer than 96 hours, poured MF agar plates no longer than 2 weeks, ampuled M-Endo broth as per manufacturer's expiration date	---		
Uninoculated media discarded if growth or surface sheen observed	---		
QC Sterility check conducted on each funnel in use at beginning and end of each filtration series (filtration series ends when 30 minutes or more elapse between sample filtrations)	---		
QC If sterility control indicates contamination, all data rejected and another sample requested	---		

Element	Yes	No	Comments
Funnels rinsed with two or three 20-30 mL portions of sterile rinse water after each sample filtration to prevent carry-over	---		
Inoculated medium incubated at 35° ± 0.5°C for 22-24 hours	---		
Samples resulting in confluent or too numerous to count (TNTC) growth invalidated unless total coliforms detected (if laboratory performs verification test before invalidation and test is total coliform-positive, sample is reported as such, but if test is total coliform-negative, sample is invalidated)	---		
Sample not invalidated if membrane filter contains at least one sheen colony	---		
All sheen colonies verified (up to a maximum of five) using either single strength (LB) or (LTB) and single strength (BGLBB) or an EPA-approved cytochrome oxidase and beta-galactosidase rapid test procedure	---		
When picking individual colonies, up to five red questionable sheen colonies and/or red non-sheen colonies verified to include different types or entire MF surface is swabbed	---		
When EC medium or EC medium + MUG used, colonies transferred by employing one option specified by 141.21 (f)(5)	---		
Swab used to transfer presumptive total coliform-positive culture can inoculate up to three different media (e.g., EC medium, LTB, and BGLBB in that order)	---		
5.3 Multiple Tube Fermentation Technique (MTF or MPN) (for total coliforms in drinking water)			
Total sample volume of 100 mL examined by test configuration found in 141.21 (f)(3) or Appendix G	X		
Media			
LTB used in presumptive test and BGLBB in confirmed test	X		
LB used if system conducts at least 25 parallel tests between this medium and LTB and demonstrates false-positive rate and false-negative rate for total coliforms of less than 10%, with comparison documented and records retained	---		
LTB pH 6.8 ± 0.2	X		
BGLBB pH 7.2 ± 0.2	X		
Test medium concentration adjusted to compensate for sample volume so resulting medium single strength after sample addition	X		
If single 100 mL sample volume used, inverted vial replaced with acid indicator	X		

Element	Yes	No	Comments
Medium autoclaved at 121°C for 12-15 minutes			
Inverted vials in sterile medium free of bubbles and at least one-half to two-thirds covered after water sample added	X		
Refrigerated sterile MTF media incubated overnight at room temperature before use, with tubes/bottles showing growth and/or bubbles discarded	X		
Prepared broth media stored in dark at <30°C for no longer than 3 months in screw-cap tubes/bottles, two weeks for those with loose-fitting closures	---		
Media discarded if evaporation exceeds 10% of original volume	X		
Inoculated medium incubated at 35°C ± 0.5°C for 24 ± 2 hours	X		
If no gas or acid detected, inoculated medium incubated for another 24 hours	X		
All samples showing turbid culture (i.e., heavy growth, opaque) in the absence of gas/acid production invalidated and another sample collected from the same location (if laboratory performs confirmed test on turbid culture and confirmed test is total coliform-positive, sample reported as such, but if total coliform-negative, sample is invalidated)	X		
All 24- and 48-hour gas-positive or acid-positive tubes confirmed using BGLBB	X		
Completed Test not required	X		
When MTF test used on water supplies that have a history of confluent growth or TNTC by the MF procedure, all presumptive tubes with heavy growth without gas/acid production submitted to confirmed test and fecal coliform/*E. coli* test to check for coliform suppression	X		
5.4 Presence-Absence (P-A) Coliform Test (for drinking water)	---		
Medium	---		
When six-times formulation strength medium used, medium filter-sterilized, not autoclaved	---		
Medium autoclaved for 12 minutes at 121°C with total time in autoclave less than 30 minutes and with space between bottles	---		
Medium pH 6.8 ± 0.2	---		
Prepared medium stored in the dark at <30°C for no longer than 3 months	---		

Element	Yes	No	Comments
Stored medium discarded if evaporation exceeds 10% of original volume	---		
100 mL sample inoculated into P-A culture bottle	---		
Medium incubated at 35° ± 0.5°C and observed for yellow color (acid) after 24 and 48 hours	---		
Yellow cultures confirmed in BGLBB and fecal coliform/*E. coli* test conducted	---		
Non-yellow turbid culture in P-A medium invalidated and another sample obtained from the same location (if confirmed test performed and sample is total coliform-positive, sample is reported as such, but if confirmed test is negative, sample invalidated)	---		
5.5 Fecal Coliform Test (using EC Medium for fecal coliforms in drinking or source water, or A-1 Medium for fecal coliforms in source water only)			
EC medium used to determine whether total coliform-positive culture taken from distribution system contains fecal coliforms, in accordance with Total Coliform Rule	X		
EC medium used to enumerate fecal coliforms in source water, in accordance with Surface Water Treatment Rule, using cultures transferred from each total coliform-positive tube	---		
Three sample volumes (10, 1, and 0.1 mL) and 5 or 10 tubes/sample volume used	---		
Autoclaved at 121°C for 12-15 minutes	X		
Medium pH 6.9 ± 0.2	X		
Inverted vials free of bubbles and at least one-half to two-thirds covered after sample added	X		
Tubes with loose-fitting closures used within two weeks, tightly closed screw-cap tubes no longer than 3 months when held in the dark at <30°C	X		
Refrigerated medium incubated at room temperature overnight before use and tubes with growth or bubbles in vials discarded	---		
Alternatively, A-1 Medium used to enumerate fecal coliforms in source water, in accordance with Surface Water Treatment Rule	---		
A-1 medium not used for drinking water samples	---		
Three sample volumes of source water (10, 1, and 0.1 mL) and 5 or 10 tubes/sample volume used	---		
Autoclaved at 121°C for 10 minutes	---		

Element	Yes	No	Comments
Medium pH 6.9 ± 0.1	---		
Inverted vials free of air bubbles and at least one-half to two-thirds covered after water sample added	---		
Loose-cap tubes stored in dark at room temperature no longer than 2 weeks, tightly closed screw-cap tubes no longer than 3 months when held in the dark at <30°C	---		
Water level in water bath above upper level of medium in culture tubes	X		
EC Medium incubated at 44.5°C ± 0.2°C for 24 ± 2 hours	X		
A-1 Medium incubated at 35°C ± 0.5°C for 3 hours, then at 44.5°C ± 0.2°C for 21 ± 2 hours	---		
Any gas detected in inverted vial considered fecal coliform positive	X		
5.6 Chromogenic/Fluorogenic Substrate Tests (MMO-MUG Test [Colilert] for total coliforms in source water and total coliforms and *E. coli* in drinking water; Colisure Test for total coliforms and *E. coli* in drinking water)			
Media			
Purchased from commercially available source only	X		
Media protected from light	X		
Colisure medium refrigerated until use, brought to room temperature before adding sample	---		
Each lot of medium checked for autofluoresence before use with 366-nm ultraviolet light with 6 watt bulb	X		
Medium which exhibits faint fluorescence discarded and another lot used	X		
Medium plus sample which exhibits color change before incubation discarded and another batch of medium used	X		
QC Each lot of medium checked by inoculating sterile water containing the medium with a MUG-positive *E. coli* strain, a MUG-negative coliform, and a non-coliform and analyzing them	X		
If Quanti-Tray or Quanti-Tray 2000 test used with Colilert medium, sealer checked monthly to determine leakage	X		
Glass bottles that contain inoculated medium checked with 366-nm ultraviolet light source with 6 watt bulb and discarded if fluorescence observed before incubation	---		

Element	Yes	No	Comments
For enumeration of total coliforms in source water with Colilert Test, 5 or 10 tube MTF, Quanti-Tray, or Quanti-Tray 2000 used for each sample dilution tested	X		
For chromogenic/fluorogenic substrate test only, sterile dechlorinated tap water, deionized water, or distilled water used as dilution water	X		
For determining presence of total coliforms in drinking water by chromogenic/fluorogenic substrate test, 10 tubes each containing 10 mL water sample or single vessel containing 100 mL sample used	X		
For Colilert Test:			
Sample incubated at 35° ± 0.5° for 24 hours (for Colilert-18 test, sample incubated 18 hours)	X		
Yellow color in medium equal to or greater than reference comparator indicates total coliform presence	X		
Medium with yellow color lighter than comparator and incubated for another 4 hours (28 hours total)	X		
Yellow color in medium lighter than comparator incubated for 28 hours recorded as negative	X		
For Colisure Test:			
Sample incubated at 35° ± 0.5°C for 28 to 48 hours			
Total coliform positive sample indicates color change from yellow to magenta			
For *E. coli* determination, UV lamp (366-nm, 6-watt) shone on total coliform-positive bottles/tubes in darkened room with blue fluorescence indicating *E. coli* presence	X		
QC Air-type incubators tested to determine time necessary for cold 100 mL water sample (or set of 100 mL water samples) to reach incubation temperature of 35°C, ensuring specified incubation time at that temperature is followed			N/A
Colilert/Colisure Test not used to confirm total coliforms on membrane filters	X		
Colilert/Colisure Test not used to confirm total coliforms in MTF or P-A tests	X		
5.7 EC Medium + MUG (for E. coli)	---		
Total coliform-positive culture transferred to EC medium + MUG	---		
Medium	---		

Element	Yes	No	Comments
QC Quality of medium lot/batch evaluated by filtering or spot-inoculating positive and negative control cultures onto membrane filter on M-Endo medium, incubating at 35°C for 24 hours, then transferring filter to NA + MUG and further incubating at 35°C for 4 hours, with results read and recorded	N/A		
Filter containing total coliform colony(ies) transferred to surface of Nutrient Agar + MUG medium	N/A		
Before incubation, presence of each sheen colony marked on petri dish lid with permanent marker, and lid and base marked to realign lid when removed	N/A		
For total coliform verification test, portion of colony transferred with needle before or after NA + MUG incubation	N/A		
Alternatively, membrane filter surface swabbed with sterile cotton swab after 4 hour incubation and transferred to total coliform verification test	N/A		
Inoculated medium incubated at 35 ± 0.5°C for 4 hours	N/A		
Fluorescence checked using UV lamp (366 nm) with 6 watt bulb in a darkened room, with any fluorescence in halo around sheen colony considered positive for *E. coli*	N/A		
5.9 Heterotrophic Plate Count for enumerating heterotrophs in drinking water	X		
Pour Plate Method used for enumerating heterotrophic bacteria in drinking water and for testing reagent grade water	X		
For systems granted a variance from Total Coliform Rule's maximum contaminant level, any method in Standard Methods used with R2A medium for enumerating heterotrophic bacteria in drinking water	X		
Media (plate count agar [tryptone glucose extract agar] and R2A agar)	X		
Plate count agar pH 7.0 ± 0.2	X		
R2A agar pH 7.2 ± 0.2	N/A		
(For Pour Plate Method) melted agar tempered at 44-46°C in waterbath before pouring, held no longer than 3 hours, and melted only once	X		
(For Spread Plate Method) 15 mL of R2A medium or other medium poured into petri dish and solidified	N/A		
Refrigerated medium in bottles or screw-capped tubes stored for up to 6 months, petri dishes with medium for up to 2 weeks (one week for R2A prepared petri dishes)	X		

Element	Yes	No	Comments
MUG added to EC medium before autoclaving or commercially available EC + MUG used	---		
Final MUG concentration 50 μg/mL	---		
Medium pH 6.9 ± 0.2	---		
Inverted vial omitted (optional)	---		
Test tubes and autoclaved medium checked for autofluorescence before use with 366-nm UV light	---		
If fluorescence exhibited, non-fluorescing tubes or another lot of medium that does not fluoresce used or MUG-positive (*E. coli*) and a MUG-negative (e.g. uninoculated) control included for each analysis	---		
Prepared medium in tubes with loose-fitting closures used within two weeks, or three months for tightly closed screw-cap tubes when held in the dark at <30°C	---		
Uninoculated medium with growth discarded	---		
QC Each lot of commercially prepared medium and each batch of laboratory-prepared medium checked by inoculating LTB with positive and negative culture controls, incubating at 35°C ± 0.5°C for 24 hours and then transferring to EC Medium + MUG for further incubation at 44.5°C ± 0.2°C for 24 hours, with results read and recorded	---		
Water level of water bath above upper level of medium	---		
Incubated at 44.5° ± 0.2°C for 24 ± 2 hours	---		
Fluorescence checked using UV lamp (366-nm) with 6 watt bulb in a darkened room	---		
5.8 Nutrient Agar + MUG Test (for *E. coli*)	---		
Medium	---		
Medium autoclaved in 100 mL volumes at 121°C for 15 minutes	---		
MUG added to Nutrient Agar before autoclaving or Nutrient Agar + MUG purchased commercially	---		
Final MUG concentration 100 μg/L	---		
Medium pH 6.8 ± 0.2	---		
Medium in petri dishes stored refrigerated in plastic bag or tightly closed container and used within two weeks	---		
Refrigerated sterilized medium incubated at room temperature overnight and plates with growth discarded	---		

Element	Yes	No	Comments
Countable plates obtained for most potable waters by plating 1.0 mL and/or 0.1 mL volume of undiluted sample	X		
At least duplicate plates per dilution used	X		
(For Pour Plate Method)			
Sample pipetted aseptically into bottom of petri dish and then 12-15 mL tempered melted agar added	X		
Sample mixed with spillage avoided	X		
After solidification on level surface, plates inverted and incubated at 35°C ± 0.5°C for 48 ± 3 hours	X		
Plates stacked no more than four high	X		
(For Spread Plate Method)			
0.1 or 0.5 mL of sample or dilution pipetted onto surface of pre-dried agar plate and inoculum spread over entire agar surface using sterile bent glass rod	N/A		
Inoculum absorbed completely before plates inverted and incubated at 20-28°C for 5-7 days	N/A		
(For Membrane Filter Technique)	N/A		
Volume filtered to yield between 20-200 colonies	N/A		
Filter transferred to petri dish containing 5 mL solidified R2A medium and incubated at 20-28°C for 5-7 days	N/A		
Petri dishes with loose-fitting lids placed in container with close fitting lid and moistened paper towels	N/A		
Colonies counted using stereoscopic microscope at 10-15X magnification	N/A		
(For Pour Plate and Spread Plate Techniques)	X		
Colonies counted manually using dark field colony counter	X		
Only plates with 30 to 300 colonies counted, except for plates inoculated with 1.0 mL of undiluted sample	X		
Fully automatic colony counters not used	X		
QC Medium sterility verified by pouring final control plate and data rejected if control contaminated	X		
5.10 Membrane Filter Technique (for enumerating total coliforms in source water)	X		
Same as Section 5.2, Membrane Filter Technique (for total coliforms in drinking water), except invalidation does not apply	X		

Element	Yes	No	Comments
Appropriate sample dilutions used to yield 20 to 80 total coliform colonies per membrane	X		
Initial counts adjusted based upon verified data	N/A		Not used for regular action
QC If two or more analysts available, each counts total coliform colonies on same membrane monthly and agree within 10%	X		
5.11 Multiple Tube Fermentation Technique (for enumerating total coliforms in source water)	X		
At least three series of 5 tubes each with appropriate sample dilutions of source water used	X		
Same as Section 5.3, Multiple Tube Fermentation Technique (for total coliforms in drinking water) except on sample invalidation	X		
All samples invalidated which produce turbid growth in the absence of gas/acid production in LTB or LB and another sample obtained, which may be tested using another method	X		
Alternatively, confirmed test performed on turbid culture in the absence of gas/acid production and, if total coliform-positive, most probable number reported, or if total coliform-negative, sample invalidated and another requested	X		
5.12 Fecal Coliform Membrane Filter Procedure (for enumerating fecal coliforms in source water)			
Medium	X		
m-FC broth (with or without agar) sterilized by bringing to boiling point, not autoclaved	X		
Medium final pH 7.4 ± 0.2	X		
Prepared medium refrigerated and broth discarded after 96 hours, poured agar medium in petri dishes after 2 weeks	X		
Uninoculated medium discarded if growth observed	X		
Sample volumes yield 20-60 fecal coliform colonies per membrane for at least one dilution	X		
QC Funnels rinsed with two or three 20-30 mL portions of sterile rinse water after each sample filtration to prevent carry-over	X		
QC Sterility checked at beginning and end of each filtration series and all data rejected from affected samples and resampling requested if controls contaminated	X		
Inoculated medium incubated at 44.5°C ± 0.2°C for 24 ± 2 hours	X		

Element	Yes	No	Comments
QC If two or more analysts available, each counts fecal coliform colonies on same membrane monthly and counts agree within 10%	X		
6 SAMPLE COLLECTION, HANDLING, AND PRESERVATION			
6.1 Sample Collector			
Trained in aseptic sampling procedures and, if required, approved by appropriate regulatory authority or designated representative	X		
6.2 Sampling			
Sample representative of water distribution system	X		
Water taps used for sampling free of aerators, strainers, hose attachments, mixing type faucets, and purification devices	X		
Cold water tap used	X		
Service line cleared before sampling by maintaining steady water flow for at least 2 minutes	X		
At least 100 mL sample volume collected, allowing one inch air space in container	X		
Sample information form completed immediately after sample collection	X		
Source water representative of supply, collected not too far intake at a reasonable distance from shore	X		
6.3 Sample Icing			
Samples held at $<10°C$ during transit to laboratory (recommended for drinking water, required for source water)	N/A		
6.4 Sample Holding/Travel Time			
Time from sample collection to initiation of analysis for total coliforms, fecal coliforms, or *E. coli* does not exceed 30 hours for drinking water samples	X		
Time from sample collection to initiation of analysis for total coliforms and fecal coliforms in source water and heterotrophic bacteria in drinking water does not exceed 8 hours	N/A		
All samples analyzed on day of receipt by laboratory, unless laboratory receives sample late in day and then refrigerates sample overnight and begins analysis within holding time	X		
6.5 Sample Information Form			

Element	Yes	No	Comments
Entered on sample information form in indelible ink: - name of system (PWSS identification number if available) - sample identification (if any) - sample site location - sample type (e.g. routine, repeat, raw or process) - date and time of collection - analysis required - disinfectant residual - name of sampler and organization (if not water system) - sampler's initials - person(s) transporting sample from system to laboratory (if not sampler) - transportation condition (e.g. $<10°C$, protection from sunlight), if shipper used, shipping records available - any remarks	X		
6.6 Chain-of-Custody			
Applicable regulations followed by collectors and laboratory	X		
7. QUALITY ASSURANCE			
Written QA Plan prepared, followed, and available for inspection	X		
8. RECORDS AND DATA REPORTING			
8.1 Legal Defensibility			
Compliance monitoring data legally defensible by keeping thorough and accurate records	X		
QA plan and/or SOPs describe policies and procedures used by facility for record retention and storage	X		
Chain-of-custody procedures used if samples expected to become part of legal action	X		
8.2 Maintenance of Records			
Microbiological analyses records kept by or accessible to laboratory for at least 5 years or until next certification data audit completed, whichever is longer	X		
Client water system notified before disposal of records			
8.3 Sampling Records			
Data recorded in ink with changes lined through such that original entry visible and changes initialed and dated	X		

Element	Yes	No	Comments
Sampling records include: - sample information form, from Section 6.5 - date and time of sample receipt by laboratory - name of laboratory person receiving sample - if any deficiency in sample condition noted, sample, at a minimum, flagged - if sample transit time exceeds 30 hours (8 hours for source water samples), sample tagged	X		
8.4 Analytical Records			
Data recorded in ink with changes lined through such that original entry visible and with changes initialed and dated	X		
Analytical records include: - laboratory sample identification - date and time analysis begins - laboratory and person(s) responsible for performing analysis - analytical technique or method used - all items marked QC - results of analysis	X		
8.5 Preventive Maintenance			
Preventive maintenance and repair records for all instruments and equipment kept for 5 years	X		
9 ACTION RESPONSE TO LABORATORY RESULTS			
9.1 Testing Total Coliform-Positive Cultures			
For the Total Coliform Rule, all total coliform positive cultures tested for presence of either fecal coliforms or *E. coli*	X		
9.2 Notification of Positive Results			
For Total Coliform Rule, proper authority notified promptly by laboratory of positive total coliform, fecal coliform or *E. coli* results	X		
Total coliform positive result based on confirmed phase for MTF Technique and P-A Coliform Test or verified test for MF Technique (no requirement for confirmation of positive Colilert/Colisure, fecal coliform or *E. coli* tests)	X		
9.3 Invalidation of Total Coliform-Negative Sample			
For Total Coliform Rule, proper authority notified when results indicate non-coliforms may have interfered with total coliform analysis	X		

Ex. 5 - Deliberative

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